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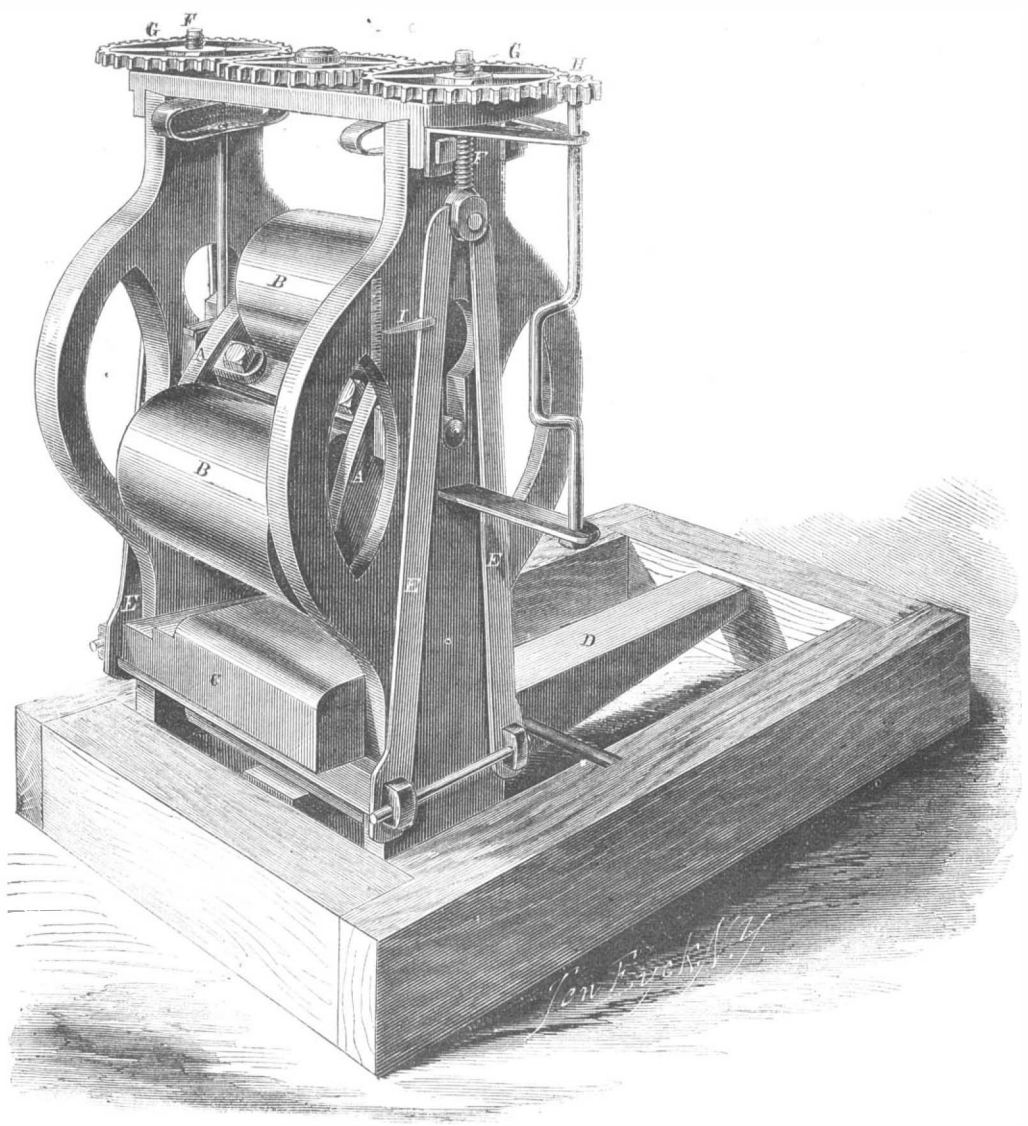
Hammer for Making Iron Plates.

The annexed engraving illustrates a novel machine for reducing the thickness of iron plates, invented by William Beach, of Philadelphia. It consists of two rollers hung in a revolving frame so that at every revolution of the frame the rollers strike the bar or plate of iron placed on the anvil beneath them; the rollers also rotating upon their own axes, and thus combining both hammering and rolling in the same operation.



BEACH'S HAMMER ROLLER FOR MAKING IRON PLATES.

The frame, A, which carries the rollers, B B, is hung in strong iron-frame work, and is caused to revolve by a pulley on the end of its shaft. The anvil, C, rests upon one end of the lever, D, and is to be counterpoised by a weight upon the opposite end of the lever. Additional supports for the anvil are also provided in the straps, E E E, and the hight of the anvil, or its distance from the rollers, B B, may be varied by altering the length of these straps; thus regulating the thickness of the plate. This is effected by means of screws, F F, at the upper ends of the straps which pass through the axes of the spur wheels, G G; these wheels being connected by an intermediate wheel, and turned by a pinion, H, upon the upper end of a crank rod. An index, I, secured to one of the straps, E, traverses a graduated scale upon the solid framework of the machine, and indicates with minute accuracy the distance at which the rollers pass above the anvil, and consequently, the thickness to which the bar or plate is being reduced.

The inventor says that 1,000 blows may be given per minute, and though the machine was designed especially for rolling armor plates for vessels, it may be used for ordinary shop work.

Further information in relation to this machine may be obtained by addressing the inventor, Wm. Beach, at 1,204 Noble street, Philadelphia.

Strength of Franklinite Iron.

From the recent trials made by the admiralty of Great Britain of the best English boiler plate iron from different makers in Staffordshire, Derbyshire and Shropshire, the tensile strength upon a square inch was found to be 19·6 tuns, or 44,000 pounds. The English Low Moor bar, as tested at Alger's forge in Boston, gave an ultimate strength of 52,850 pounds. The New Jersey Franklinite bars, tested at Baltimore, reached over 77,000 pounds. The Director of the National Forges in France, speaking of a bar of American Franklinite, says:—"The aspect of the fracture was all nerves. An immense number of experiments have been made with this press, not only upon all the irons of France, but upon the best irons of England, Sweden, Spain and Siberia. Never has any bar tried reached the absolute tenacity of the Franklinite. It began to stretch at 15,000 kilograms, and the charge under which it broke was 25,000. Absolute tenacity per millimetre, 40 kilograms 8 m."

PHILADELPHIA WATER WORKS---JONVAL WHEELS.

Great preparations are being made at Fairmount, Philadelphia, to supply the city with water from what has been called the "Extension Water Works." A large new wheel-house is being erected at the upper end of the old one, near the bridge on the Schuylkill river, and three new Jonval turbine wheels, designed and constructed by Mr. Emile Geyelin, have already been put in, but they will not be in operation for a considerable period of time yet, owing to the unfinished condition of the wheel house, &c. These wheels are immense masses of mechanism. Their horizontal water guides resemble huge steam boilers. No where else in the world can such great water pumping motors be seen in one place. When in operation they are intended to raise 16,000,000 gallons of water per day, and throw it into the reservoir at an elevation of 115 feet. Each wheel is 9 feet in diameter outside of the buckets, and the hight of the fall is 11 feet. Each will operate two pumps having cylinders 18 inches in diameter with a stroke of 6 feet, and 12 strokes will be made per minute. Wooden cogs are employed in one of the wheels of each turbine in gearing down the speed of the wheel to the pump. Wooden cogs are now very commonly employed in the gearing of steam propeller engines; this has been found advantageous for quiet and smooth running in comparison with the use of entire metal cog gearing. There is a turbine constructed by Mr. Elwood Morris, which has been running at those Water Works for eleven years in conjunction with the series of old breast wheels. It has already done good service, and is apparently capable of doing work for twenty years to come. It is 7 feet in diameter, and throws 121 gallons per stroke. The advantages of turbine over breast wheels in such a situation is, that they can run constantly, whereas the breast wheels are frequently stopped with back water.

A LETTER from Cherbourg says that the Minister of Marine has resolved to submit the iron-cased frigates launched lately to a decisive trial to test their sea-worthiness. The *Couronne*, which has arrived from L'Orient at Cherbourg, is selected for the experiments. She is to be sent across the Atlantic. A question which has given rise to a serious controversy among seamen as to the possibility of a completely iron-cased vessel accomplishing the voyage will thus be solved.

To the question "what is the weight of a million dollars in gold?" an officer of the mint answers as follows:—The weight of one million dollars United States currency in gold is 53,750 troy ounces. This makes 4,479 lbs. 2 oz.—or nearly two tuns and a quarter reckoning 2,000 lbs. to each tun.

THE navy of the Mississippi river will soon number about one hundred war vessels, consisting of gunboats, mortar boats and rams.

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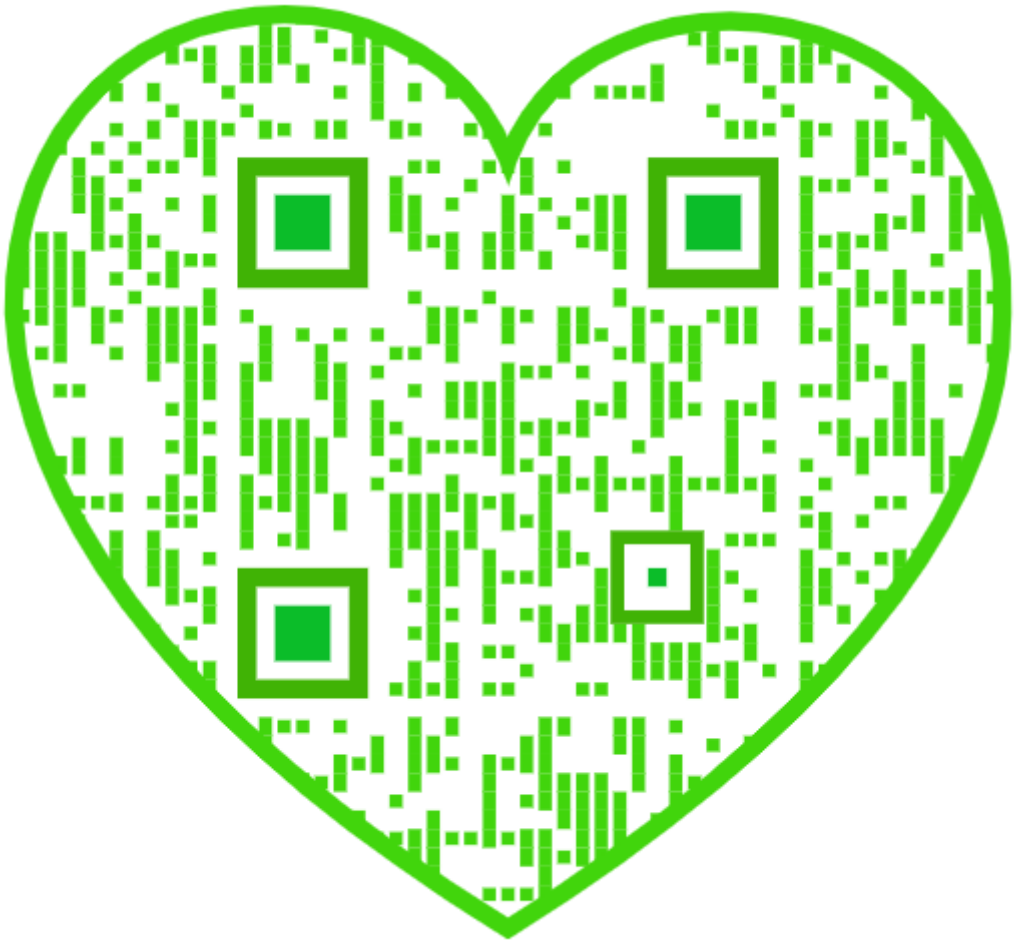

NOTES ON MILITARY AND NAVAL AFFAIRS.

THE SITUATION.

OPERATIONS BEFORE RICHMOND—A SEVERE BATTLE.

The army of Gen. McClellan is in front of Richmond, and in attempting to gain the southern bank of the Chickahominy river, a great battle ensued. The enemy fell suddenly and in great force upon the advance brigade, under commaud of Gen. Silas Casey, numbering about six thousand men, composed of New York and Pennsylvania troops. This attack began on Saturday, the 31st ult., and at the close of that day our forces engaged were routed, their camp equipage and baggage taken, and, we regret to state, 19 cannon were captured and borne in triumph to the enemy's headquarters at Richmond. Frederick the Great observed that "the passage of rivers in the presence of the enemy is one of the most delicate operations in war." The advance guard is necessarily exposed to attack, and as all the troops cannot cross at once this danger is much enhanced. The enemy took advantage of this necessity, and came down heavily upon a comparatively small force, who could not withstand the shock. Gen. McClellan determined to retrieve all the ground lost in the affair of Saturday; accordingly on Sunday morning, after making all the necessary precautionary movements, and taking the proper steps to move forward, he sent up a balloon to the distance of two thousand feet, where it was kept, and a regular telegraphic communication established from that elevated point of view direct to the Commanding-General. As soon as the telegraphers were ready they minutely described the location and number of the enemy's troops. And as they advanced—for they were again coming forward to charge upon what they supposed our demoralized troops—the operators gave the General their force and the direction in which they were advancing, and he promptly ordered his troops to the proper place, when the enemy were met and repulsed.

An attempt was made by the enemy to shoot down the aerial general, and after repeated firing they succeeded in exploding shells near the balloon; in fact so near that it was deemed imprudent to remain up any longer in that precise location, and, accordingly, the balloon was lowered to the ground, to be shifted to another position. Not many minutes elapsed before it was again sent aloft, and in a position not easily reached by the enemy's missiles.

The reverse of Saturday was fully retrieved on Sunday, and a splendid victory was gained. The Union forces are now in sight of Richmond, and we may at any moment hear of another great battle, or another ignominious retreat as at Corinth. The battle of Sunday was fought under the direction of Gen. McClellan, who was most gallantly sustained by Generals Heintzelman, Sumner, Richardson, Hooker, Sedgwick, Sickles and Meagher, and the brave troops under their command. The rebels were routed and driven back at the point of the bayonet, and left 1,200 of their dead on the field. The loss on both sides is severe. We understand that Gen. Casey's troops were mostly raw recruits, and if so we cannot understand why they should have been allowed the advance of the army.

THE EVACUATION OF CORINTH.

Where are the rebels against the government to make their last and final stand? is now a question of intense interest. Columbus, Ky., was at one time proclaimed the Gibraltar of the Confederates, the key to the vast Mississippi valley—the stronghold for the defence of Memphis and even New Orleans. Bowling Green was a point of great stragetic importance, the key to the capital of Tennessee as well as a base for operating against the independence of Kentucky in her proud place as a State of the Union. But by the superior strategy of the Federal generals and the indomitable bravery of the Union troops, these confessedly strong positions were all turned and evacuated of their rebellious contents, and the victorious legions have pressed forward to the very central spot where treason was incubated and hatched into life. Gen. Beauregard, after having been driven out of the border States, finally took up his position at Corinth, a small town in Mississippi, at the junction of important railway connections, and issued his urgent appeals to the people and governors of the insurgent States to rally to his support, and, as it was supposed, for a grand struggle for Southern independence. The battle of Pittsburg Landing deprived him of 10,000 men. Still, information continued to reach our camp, from stragglers and deserters, that his shattered forces were being rapidly reinforced and that he was fortifying his position for a grand fight. Corinth was admirably located for defence. On the northern and eastern sides it was protected by heavy and almost impassable swamps, rendering the approaches to it in the direction of the Federal forces both dangerous and difficult. Gen. Halleck had literally to move like a snail toward his wily foe, and just as he was about to pounce upon him, lo! he was not there. The evacuation of Corinth took the whole country by surprise, and up to this time there is a mighty puzzle to know whither Beauregard and his troops have gone. Some think he is in Richmond with a portion of his army; others, that he is wandering about the borders of Mississippi and Tennessee looking anxiously for the "last ditch" in which to die in defence of his treason to that government which fed and clothed him, and educated him in the art of war, to stand up for its defence whenever and wherever assailed. Such is, ofttimes, the ingratitude of man.

Corinth was entered by the Federal forces under Gen. Pope, on Saturday afternoon, May 23d. The Mayor came out to meet him, and made a formal surrender of the place. Gen. Halleck in his dispatch to the war office, says:—

The enemy's position and works in front of Corinth were exceedingly strong. He cannot occupy a stronger position in his flight. This morning he destroyed an immense amount of public and private property, stores, provisions, wagons, tents, &c. For miles out of the town, the roads are filled with arms, haversacks, &c., thrown away by his fleeing troops. A large number of prisoners and deserters have been captured, estimated by Gen. Pope at 2,000. Gen. Beauregard evidently distrusts his army, or he would have defended so strong a position. His troops are generally much discouraged and demoralized. In all the engagements for the last few days, their resistance has been slight.

THE VALLEY OF THE SHENANDOAH RE-POSSESSED.

The bold operation of Gen. "Stonewall" Jackson in forcing Gen. Banks's small army out of the Shenandoah valley has been brought to a speedy termination. The forces of Gen. Fremont and a portion of Gen. McDowell's have formed a junction in the valley, and were pursuing Jackson with all possible speed. The enemy's rear guard was driven out of Strasburg on Sunday evening the 1st instant, and General Fremont pushed on after them as far as Woodstock, where a halt was made for the night, the enemy being only three miles distant. On Monday morning the pursuit was continued and the enemy was driven from three positions, taken up by them to retard the advance of our troops. The flight of the rebels was a hurried one, as is evidenced by the fact that the roads and woods along the line of retreat are strewn with arms, stores and clothing.

We are rejoiced to know that Col. Kenly, of Maryland, is not dead, as was reported, but is safe at Winchester. Report speaks highly of Dr. Antisell, Surgeon of Gen. Williams' Brigade, through whose almost superhuman efforts nearly all our wounded and sick soldiers, during Gen. Banks's retreat, were saved from the hands of the enemy. Dr. Antisell was formerly Chief Examiner in the Patent Office, and is a most worthy and efficient man. We are pained to say that he came near being turned out of the Patent Office under the operation of the Potter's Investigating Committee, on a charge of disloyalty. A more infamous charge was never made against an honorable and high-minded and capable man.

GUERILLA WARFARE AND ITS TREATMENT.

It is the announced purpose of the confederates, in case their armies are defeated, to resort to guerilla warefare; thus hoping to worry out the patience and long suffering of the government, in its attempt to restore order and law once more amongst them. This species of warfare, although irregular, has been practiced more or less for a long period. It was employed with considerable success against the great Roman Generals Pompey and Metullus. During the Peninsular War, the Spanish guerilla did essential service to the English army in cutting off French convoys, couriers, &c. The Mexicans also resorted to it when their country was invaded by the American forces under Gen. Scott. When hard pressed these bands of marauders scatter in every direction, and mingle with the people, and are thus lost sight of, until they are once more ready to make a foray. The guerilla system is now somewhat in vogue in Western Virginia, Tennessee, and Missouri, and nothing but the infliction of summary punishment upon all who are caught will ever suppress it. They are nothing more or less than highwaymen and murderers, and deserve to be treated as such.

Brigadier-Gen. Schofield, commanding the Missouri State Militia, has issued a general order, stating that hereafter all guerillas and marauders in that State, caught in arms, engaged in their unlawful warfare, will be shot down on the spot, and that all citizens who give shelter and protection to these outlaws, or who will not give all the assistance in their power to the military authorities in detecting and bringing them to punishment, will be regarded and treated as aiders and abettors of the criminals.

This is right; a milk and water policy with these wicked men will never put a stop to these foul deeds of murder and robbery; therefore they must be made feel the certain rigors of the avenging arm of justice.

SUCCESSFUL OPERATIONS OF THE BLOCKADING FLEET.

The English press has been quite *mum* of late on the question of an "inefficient blockade." It is no longer a "paper blockade;" indeed, our excellent friend, John Bull, will soon begin to growl, we fear, that the blockade is unnecessarily stringent and severe, inasmuch as many valuable prizes are beginning to fall into our hands which belong to his loving and loyal subjects. The record is encouraging, and many of our "jolly tars" are made happy over their good luck in catching these stray craft that attempt to break Uncle Sam's paper blockade.

The following steamers (several British) have been seized while attempting to run the blockade. The *Circassian*, valued with her cargo at $1,200,000; *Bermuda*, *Cambria*, *Fuan*, *Labuan*, *Patras*, *Magnolia*, *Florida*, *Ella Warley*, *Stettin*, *Calhoun*, *Lewis Wallace*, *Fox*, and rebel gunboat *Planter*, whose aggregate value, with cargo, is estimated at $5,000,000.

We are happy to notice that commander Haxtun, of the *State of Georgia*, blockading at Wilmington, has just arrived in this city with the prize steamship *Nassau*. This steamer formerly ran between Charleston and Nassau, carrying arms and ammunition to the rebels, and has made several successful trips. She undertook to run into Wilmington on the 27th of May, with a cargo of Enfield rifles and ammunition, and was nabbed in the act. Commander Haxtun is an old friend, and has all the good qualities of our best naval officers. He was for over two years on the African coast, engaged in suppressing the infamous slave trade, and when ordered home last fall, instead of taking the usual furlough, he at once reported himself ready for duty, and was shortly assigned to the gun boat *State of Georgia*. He is a brave and gallant officer, and will not flinch from duty to the old flag.

PREPARATION FOR A BATTLE—GEN. M'CLELLAN'S ORDERS.

It will be interesting to many of our readers to read the following order of Major Gen. McClellan, in anticipation of a battle before Richmond. The order is clear and emphatic, and specifies all the conditions needed to insure success. No one can read it without perceiving that the General Commanding understands his business:—

1. Upon advancing beyond the Chickahominy the troops will go prepared for battle at a moment's notice, and will be entirely unincumbered, with the exception of ambulances. All vehicles will be left on the eastern side of the Chickahominy, and carefully packed. The men will leave their knapsacks, packed, with the wagons, and will carry three days' rations in their haversacks. The arms will be put in perfect order before the troops march, and a careful inspection made of them, as well as of the cartridge boxes, which, in all cases, will contain at least forty rounds. Twenty additional rounds will be carried by the men in their pockets. Commanders of batteries will see that their limber and caisson boxes are filled to their utmost capacity. Commanders of army corps will devote their personal attention to the fulfilment of those orders, and will personally see that the proper arrangements are made for parking and properly guarding the trains and surplus baggage, taking all the steps necessary to insure their being brought promptly to the front when needed. They will also take steps to prevent the ambulances from interfering with the movement of any troops. These vehicles

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must follow in the rear of all the troops moving by the same road. Sufficient guards and staff officers will be detailed to carry out these orders. The ammunition wagons will be in readiness to march to their respective brigades and batteries at a moment's warning, but will not cross the Chickahominy until they are sent for. All quartermasters and ordnance officers are to remain with their trains.

2. In the approaching battle the General Commanding trusts that the troops will preserve the discipline which he has been so anxious to enforce, and which they have so generally observed. He calls upon all the officers and soldiers to obey promptly and intelligently all orders that they may receive.

Let them bear in mind that the army of the Potomac has never yet been checked. Let them preserve in battle perfect coolness and confidence, the sure forerunners of success.

They must keep well together, throw away no shots, but aim carefully and low, and, above all things, rely upon the bayonet. Commanders of regiments are reminded of the great responsibility that rests upon them. Upon their coolness, judgment and discretion the destinies of their regiments and success of the day will depend.

TELEGRAPH WAR BALLOON.

General McClellan's valuable adjunct to his *corps d'armee*—the Lowe reconnoitering balloon—is getting to be quite an institution. During a fight lately between the rebels and a force of Union troops, in which the latter were engaged in dislodging some batteries that had been erected, the balloon did effective service in directing the movements of our artillery. A telegraph wire, attached to an instrument on board, conveyed intelligence to our men what to do and what not to do, and corrected any mistakes made by the transmission of such messages, as "too short," "just a little over," "fire lower," "the last shot took them," &c. The enemy could not be seen by the men at the batteries, and our batteries in turn were hid from the view of the enemy, the majority, of whose shots fell wide of the mark.

MISCELLANEOUS.

A portion of Gen. Curtis's army, which was ordered to reinforce Gen. Halleck, marched from Batesville, Ark., to Cape Girardeau, Mo., a distance of 240 miles, which he accomplished in ten days, some of the men being obliged to travel barefoot for the last sixty miles. This gives an average of 24 miles a day. This, for an army, is great marching.

It is announced that Little Rock, the capital of Arkansas, is fully occupied by National forces under Gen. Curtis, and that the Legislature had scattered, and Gov. Rector, who at one time threatened to whip "all creation," had fled from the State. He is doubtless looking for Claiborne Jackson, who ran away from Missouri last year. Reports also state that the people of Arkansas are showing a considerable degree of loyalty to the government.

It is an encouraging sign in the political heavens that large Union meetings have been held in Norfolk and Portsmouth, Va., and also at Columbia, Tenn. At the latter place ex-Governor Neil S. Brown came forward and urged the people to return to their allegiance, as in his opinion the Confederacy of Mr. Davis had about come to an end—that it was useless for Tennesseans longer to contend with the Federal government. Mr. Brown was at one time a member of the secession Military Board at Nashville. He is evidently a sensible man, and has found out that the government of the United States does not intend to hurt him in the least.

Wherever our soldiers have gone they have shown a most commendable spirit of industry and ingenuity. As an evidence of this, the Chicago Tribune states that since Gen. Halleck took command at Pittsburg Landing, our army has built, incredible as the story may sound, more than fifty miles of intrenchments, and full two hundred miles of wagon roads! Four parallels, each more than twelve miles in length; three or four roads—wide, *corduroyed* and bridged—leading from the landing to each *corps d'armeé*—all the works of our men, many of whom never before handled a spade or an ax in all their lives.

Gen. Mitchel is now plating with iron, and otherwise preparing for warlike operations, a ferryboat lying near Huntsville, on the Tennessee River. With this, manned with two 10-pound Parrott pieces, he hopes to bid to defiance every attempt to cross the river.

The design for the new flag for the rebel Confederacy, consists of a red flag and a blue Union. In the center of the Union is a golden sun, with thirteen rays, corresponding to the number of States. The body of the flag is ornamental, with an Argent Saltiva, or St. Andrews' Cross, the feet resting within the sides of the bar, and the lower line of the upper sinistral bar striking the bar of the Union. The designs meet the wishes of those who favor an expressive symbol of the sun as well as those who prefer the cross.

Gen. Pope, with a force of 40,000 men, has found Beauregard and his army. They were thirty miles south of Corinth, fleeing in great disorder. Gen. Pope had taken 10,000 prisoners and 15,000 stand of arms, also nine locomotives and a large number of cars. The rebels were throwing away their guns and everything that impeded their flight.

Pepper for Soldiers.

A gentleman who saw and conversed with several of the wounded soldiers who arrived from Newbern a few days since, says that they told him that pepper would be one of the most acceptable and best things that could be sent by friends to the soldiers, and one that has not been thought of. Pies and rich cakes are so injurious that many Generals forbid their being eaten, but pepper is an excellent preventative of diarrhœa, which is prostrating large numbers in the warmer climate. One of the soldiers was a veteran in the Mexican war. He stated that a liberal use of pepper had been found very useful to prevent this disease, and that he had wholly escaped by the use of it in North Carolina. It is not provided by the government, and can only be obtained of the sutlers at exorbitant prices. The soldiers advised all who send articles to soldiers to put in a supply of pepper. It is put up in tin boxes holding a quarter or half pound each; the soldiers punch holes in one end and thus make pepper castors.

The First Iron-Plated Ship.

At a recent meeting of the Archæological Society of London, Captain Windus, of the Navy, read an account of a remarkable carrack or war galley, equipped by the Knights of St. John, of Jerusalem, and described by Bosio, the historian of the Order, which had been plated with sheet-lead as a defence against bullets.

This vessel was built at Nice, in A. D. 1530, and made one of the great squadron sent by the Emperor, Charles V., against Tunis, to assist the dethroned Muley Hassan against Barbarossa.

The celebrated Andrew Dorias commanded, the expedition, and after a few days Tunis was taken by storm.

This metallic clad galley was called the *Santa Anna*, and aided greatly in taking the city. She had six decks, consequently was larger than the *Merrimac*. Her crew consisted of 500 men.

The Tone of Bullets.

A soldier writing from one of the camps on the Potomac, thus alludes to the peculiar music made by bullets passing through the air:—It is a very good place to exercise the mind with the enemy's picket rattling close at hand. A musical ear can study the different tones of bullets as they skim through the air. I caught the pitch on a large sized Minié yesterday. It was a swell from E flat to F, and as it passed into the distance and lost its velocity, receded to D a very pretty change. One of the most startling sounds is that produced by the Hotchkiss shell. It comes like the shriek of a demon, and the bravest old soldiers feel like ducking when they hear it. It is no more destructive than some other bullets, but there is a great deal in mere sound to work upon men's fears. The tremendous scream is caused by a ragged edge of lead, which is left on the shell.

FLAG-OFFICER Farragut, who is in command of the Mississippi squadron, is a Tennessean by birth. He married in Norfolk, but cut loose all his social connections there when Virginia passed the ordinance of secession, saying to his friends that he had argued with them so long as argument could avail, and now, having to choose between them and his country, should bid them farewell.

Terrible Rock Oil Conflagration.

On the 29th of May, an immense conflagration of rock and coal oil occurred at Williamsburg, Long Island. The science of the matter was fully discussed at the meeting of the Polytechnic Association, and a full report will be found on another page. The discussion was based on the account in the *Evening Post*, and the following is the revised account published in the *Post* next day:—

The fire in Williamsburg yesterday afternoon, reported in our third edition, proved to be very disastrous. It commenced at half-past two o'clock on board of a lighter, commanded by Patrick McLaughlin, lying at the foot of North Second street, as she was discharging a load of petroleum oil, at the storehouses of Messrs. Schieffelin Brothers. One of the barrels of oil fell and burst, and, being set on fire from a lighted tobacco pipe, exploded with a loud report, and was followed by a series of explosions from the other barrels, shattering the vessel and scattering the fragments far and wide. The men were sent into the air, and a sheet of fire and smoke spread over the water.

The conflagration extended to the dock with inconceivable rapidity, and in a few minutes some fifteen thousand barrels of petroleum and kerosene had exploded with the heat, pouring their contents into the East river. The lumber yard of Ebenezer Hill caught fire, and several vessels near the lighter were destroyed. Police boat No. 1 repaired to the scene of disaster, and saved several vessels. About three o'clock the fire alarm was given, and the fire companies hastened to the spot; but they found it impossible to allay the flames with water. They directed their efforts to adjoining buildings with success. It was impossible, for hours, to reach the piers which were the scene of the conflagration. The fire continued during all night. Water had no effect on it whatever, and the explosions continued for hours.

The total loss of the Messrs. Schieffelin is estimated at from $75,000 to $80,000—fully insured in a large number of city companies, in sums of from $1,500 to $5,000. The oil was received on consignment by Messrs. Schieffelin Bros. & Co. from the well-owners in Pennsylvania, to be sold for their account. The bark *Silver Cloud*, belonging to Messrs. Jewett & Co., was burned to the water—loss $25,000. A lighter took fire, was towed out into the river and scuttled—loss $10,000.

Mr. Ralph W. Kenyon lost in lumber about $4,500—insured in the Kings county and Williamsburg City Insurance Companies. The new dock at the foot of North Third street, belonging to the corporation, was totally destroyed, together with a quantity of lumber—loss $10,000. Loss of Flint & Hall, lumber dealers, $3,000; loss of Fisher, Ricard & Co., $10,000. The bark belonging to Jewett & Co. was worth $25,000—insured. Two piers belonging to the Waterbury estate were destroyed—loss $6,000; and the firm of E. Hills & Co. lost $3,000.

At the first explosion Mr. McLaughlin, the commander, was terribly burned. He jumped overboard and was rescued in a dying condition and conveyed to the Hospital. He was brother of the Register. Some five men on board the lighter are supposed to have perished. Several other persons were badly injured.

NOT a single man, out of a crew of thirty, was injured by the bursting of the 100-pound Parrott Gun on board the *Naugatuck*. This proves the value of Mr. Steven's principle of mounting and loading ordnance, by which the crew are protected beneath the deck and below the water line while loading and firing.

THE appraisers of Col. Colt's estate reckon his property at over $3,000,000, exclusive of his Western and Texan lands, his gold and lead mines in South America, and his property in England—all of which are probably worth another million.

WITH hay at a cent a pound and meal at the same price, the daily cost of keeping a horse will be twenty-eight cents, making $1 95 per week—equal to $102 20 a year.

COMMODORE Foote is a very religious man, as is well known. Some one says that the rebels, who are feeling his bombs, must think he belongs to the "Hard-shell Baptists."

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POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The regular weekly meeting of the Association was held in their room at the Cooper Institute on Thursday evening, May 22d, the President, Prof. Joy, in the chair.

The President announced the regular subject of the evening to be

ILLUMINATING MATERIALS,

and as he proposed the subject, he proceeded to open the discussion.

Illuminating materials are found in all three forms of matter: solid, liquid and gaseous. They generally contain hydrogen and carbon, and the light is emitted by the carbon while it is in an incandescent state, after it is heated by the burning of the hydrogen, and before it is itself consumed. I have in my hand a list of some 16 or 18 materials which have been used for producing light.

One of these is tallow. This has been used from time immemorial. Some of the vegetable oils have also been used from the most ancient times of which we have any knowledge; among these are palm oil and olive oil. In Greece, 2,000 years ago, they used lamps essentially the same as those which are used in some countries at the present day. I hold in my hand an earthen lamp that was dug from the ruins of Athens. It has a handle upon this side and this is the place for the wick. The material burned in it was probably olive oil. It differs, you see, but very little from the lamps which we use, and all over Germany the workmen use lamps precisely like this, only their lamps are made of tin.

Dr. STEVENS—Earthen lamps are used extensively in the western part of this country.

Prof. JOY (continuing)—The kind of fat, either animal or vegetable, used for illuminating in any country, is determined by the supply; it is a mere question of economy.

Besides the hydrocarbon compounds, there is a class of substances of a different character employed for the production of light. Among these are lime in oxyhydrogen light; the carbon points for the electric light; magnesium; and quicksilver.

Magnesium produces one of the most intense lights that we have. It is only necessary to light the end of a very small wire of pure metallic magnesium in an alcohol flame, when the wire is consumed, giving out a very brilliant light. I have tried the experiment, but it is a disagreeable one to perform, on account of the effect of the light upon the eyes. It is some time after looking at the magnesium flame before the eye is able to see ordinary objects in a room. The experiment should not be tried without providing protection for the eyes. The light in this case comes from the oxide of magnesium. The metal combines rapidly with oxygen, generating a heat which makes the oxide formed, the magnesia, incandescent, and it is this white hot magnesia that emits the light. The magnesium light might be utilized by winding a long wire of the metal upon a reel or bobbin, and unrolling the bobbin to feed forward the wire as it is consumed, were it not for the high cost of the metal. It exists in large quantities, especially in this country. At Hoboken there are deposits of porphyry which contain magnesia, and in Westchester county are beds of dolamite, composed to a large extent of magnesia. Magnesium is abundant; the difficulty is to separate it from the oxygen and other substances with which it is combined.

Quicksilver is used to conduct a stream of electricity. (The speaker then described Way's electric light, the same that was illustrated not long since in the SCIENTIFIC AMERICAN.)

Mr. BABCOCK—I should like to hear the President's account of the Drummond light.

Prof. JOY—I spoke of that in passing. It is very improperly called the calcium light—there is no calcium in it except as lime, the oxide of calcium. The oxyhydrogen light is formed, as you are probably all aware, by heating a bit of lime in the flame of the oxyhydrogen jet. The lime must be chemically pure, and it is consequently necessary to prepare it for the purpose. It is precipitated from a solution, and thus obtained free from silica or any other substance. It is then pressed in a powerful hydraulic press, in order to make it hard enough to be sawed into pieces of suitable size. Lime is used because it cannot be fused, and under the intense heat of the oxyhydrogen jet, it gives out the brilliant light with which you are all familiar.

The oxyhydrogen flame is formed by burning pure hydrogen gas in pure oxygen. The gases are retained in separate vessels, and are mixed just as they issue from the pipes. The hydrogen pipe surrounds that which conducts the oxygen, and the oxygen pipe is now made to protrude a very little beyond the end of the hydrogen pipe. This is the latest improvement in the oxyhydrogen light.

Dr. STEVENS—The President forgot to mention one substance in his list of illuminating materials—bayberry tallow. This is used to considerable extent. It is a vegetable tallow, produced by the bayberry bush.

Mr. STEVENS—The Balm of Gilead tree produces a tallow which has been collected and made into candles. Each bud has a small quantity of tallow, and if the buds are placed in hot water the tallow is melted, and may be skimmed from the surface. I have collected a very little of this myself, and I have heard my mother say that she and her mother collected one year enough to serve for light for several months.

The PRESIDENT—Will Prof. Seely give us the chemistry of illuminating materials?

Prof. SEELY—The more I think of the matter, the more am I amazed at what chemistry enables us to do. If you bring us a candle we do not need to light it in order to tell you what it is worth. A hydrocarbon, to give the most light, should have the hydrogen slightly in excess. If the carbon is in excess there will be smoke. It has been frequently talked over here and is now generally understood, that the light comes from the carbon, heated to a white heat. It may, perhaps, be more easily comprehended if it is presented thus: Suppose we had a quantity of carbon, in the form of coal for instance, which we wished to burn in the way to get the most light from it possible, how should we wish to arrange it? We should want it in a thin stratum so as to expose a large surface, and we should wish to keep it hot as long as possible before it was burned, for as soon as combustion took place it would be converted into invisible gas, and would cease to give out light. Finally, we should want it in small pieces, so that the light might be soft to the eye. We have no means of arranging carbon in this way. But nature makes the arrangement beautifully. By combining atoms of carbon with atoms of hydrogen, which separates at a lower temperature than carbon will burn at, the carbon is heated before it is burned; and as the hydrogen occupies much more space than the carbon, the carbon atoms are enveloped by the hydrogen, and thus kept from burning until the hydrogen is consumed. The burning, too, is confined to an exceedingly thin film on the outside of the blaze, and thus the illuminating power of the carbon is fully utilized.

Mr. President, we have had a very grand exhibition this afternoon of combustion of illuminating materials. Some 18,000 barrels of petroleum oil have been burning in Williamsburg, and if it had occurred in the night, I have no doubt that we should have had the finest illumination that has ever taken place. As it was, the smoke as seen even from the lower part of the city, made the most magnificent spectacle that I have ever seen. The *Express* says that the fire originated from an explosion which occurred in one of the vessels which were lying at the wharf discharging petroleum. The account says that after the explosion in the vessel, a barrel on the wharf exploded, and the word explosion occurs half a dozen times in the account. I have no doubt that we shall have a discussion in the papers whether petroleum will explode. Some people seem to think that if you touch a match to a cask of petroleum it will go off like gunpowder, and there is quite a common notion that rock oil will explode. It will not do it. The explosion occurs in this wise: Petroleum has the property above all liquids of passing through capillary tubes. If you put it into a wooden barrel it will go right through the staves, and the barrel will be greasy directly on the outside. The most volatile portion passes through the most readily, and when this, in the form of vapor, is mingled with the atmosphere in a confined place, as the hold of a vessel, an explosive mixture is formed. Petroleum is not explosive; but a mixture of the vapor of petroleum with atmospheric air is explosive; and this mixture can be formed only in a close chamber. The question is similar to the famous one, "Will Saltpeter explode?" and the answer is analogous. Saltpeter alone will not explode, any more than a stick of wood or a brick; but when saltpeter is mixed with any combustible, the mixture is explosive.

Mr. CHURCHILL—I understood Prof. Seely to say that many of the hydrocarbons in burning would necessarily smoke. I made a great many experiments with lamps while on the committee last winter, and I have continued them since, and I think there is no fat that can not be burned without smoke in a still atmosphere, if the lamp is not moved about.

Prof. SEELY—You must have misunderstood me; I agree with you entirely.

The PRESIDENT—There are a few minutes left, will any one make any remarks or ask any questions?

I will inform the Society that I shall leave the country in a few days for Europe, and I shall regard myself as a sort of traveling agent of the Society at my own expense. I shall try to learn everything of interest to this association, especially the working of similar societies, which I shall communicate to you on my return, as occasion may offer. Since I have had the honor to preside over your meetings, I have become exceedingly attached to the work. I shall be absent five months, and perhaps you ought to take some steps to provide a presiding officer during my absence.

Mr. DIBBEN—Mr. President, during the summer months it has been our practice to discontinue our meetings, and in the few meetings that we shall hold during your absence, we can choose a chairman *pro. tem.*

On motion of Mr. Fisher, the thanks of the Society were voted to the President for the firm and satisfactory manner in which he had presided over the meetings.

The subject of superheated steam was chosen for the next meeting, and the Society adjourned for two weeks.

Matters of Interest in the English Exhibition.

We extract the following from the *Mechanics' Magazine*:—

In 1858 Messrs. Harvey and Co. erected, for the Southwark and Vauxhall Water Company, at Battersea, a pumping-engine, the cylinder of which is 112 inches diameter, and weighs 36 tuns. This engine, though the largest and most powerful ever built for such a purpose, is of the most simple construction. The steam valves are all on the equilibrium principle, and the arrangement of parts is throughout such that this colossus of engines, so to speak, is as completely under the control of a pigmy, but intelligent engineman, as is the small engine in a factory.

The quantity of water pumped up for the supply of London daily amounts to 115,000,000 gallons. Of this enormous quantity 79,000,000 of gallons are pumped by means of single-acting engines on Harvey's plan. In fact, the reputation of this firm for gigantic pumping-engines is world-wide. Those who have time to visit Battersea and Lea-bridge, where the originals of the models referred to exist, would find that they were amply repaid for their trouble by an inspection of them.

The American steam fire engine, forwarded by Mr. Hodges, of the Lambeth Distillery, we have before spoken of, but why it should be placed in a corner, where it is difficult for its merits to be disclosed, is a question for the Commissioners, whose ways are difficult to comprehend or account for.

Of traction engines and highway locomotives there are several varieties. Those of Robey & Co., of Lincoln, are not the least excellent of them.

JUST now the civilized nations of the world derive their chief revenue from tobacco. Without it the Pope would be bankrupt in a month. Last year the English government derived $28,000,000 revenue, and the French $36,000,000, from the weed that vanishes in smoke. Tthe greater part of the tobacco which yields to foreign powers their chief revenue is grown in America.

THE number of horses in the world is estimated at about 27,000,000; of this number, the United States have 5,000,000. The general estimate has been eight to ten horses in Europe for every hundred inhabitants.

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One of the New Explosives.

At a recent meeting of the Royal Institution of Great Britain, F. A. Abel, Esq., F. R. S., delivered a lecture on some of the causes, effects and military application of explosives, from which we make the following extracts :—

Here is an explosive substance belonging to this class, of very recent origin, a member of a most interesting family, one of the derivatives of that remarkable substance, aniline, to which we are indebted for those beautiful new colors, mauve and magenta. It is curious that this body, aniline, which has become of such importance in connection with arts and manufactures, should also exhibit what may be called "warlike tendencies." By the action of nitrous acid at a low temperature upon aniline, the explosive substance to which I refer is produced. This singular body rejoices, I am happy to say, in the comparatively simple name of *nitrate of diazobenzol;* compared with the names which are possessed by some of the members of this family, this is certainly not a hard one. [A small quantity was exploded on copper foil, which was shattered.] You see that it appears quite equal in its explosive power to fulminate of silver. I cannot help devoting a few moments to a comparison of its explosive properties with those of fulminate of silver. The silver compound explodes with a slight touch given by a hard substance; whereas this new compound can actually be rubbed between hard surfaces without exploding; at least, I have found it so on frequent occasions, although I have finally exploded it in that way. Some time is necessary, however, for producing, by friction, the requisite heat for its decomposition. The slightest touch, you observe, explodes fulminate of silver, and it does not admit of being rubbed. The *nitrate of diazobenzol*, when compared with the fulminate in this way, appears to be the less explosive substance; and yet, when directly exposed to heat, it is certainly the most sensitive of the two. If we expose the fulminate of silver in this little tin tube to the heat of boiling water, I think we shall find that it is not affected. [The experiment was performed with the result anticipated.] But if I heat, in the same manner, a little of this fulminate of aniline—if I may use the term—(although there are one or two compounds, also derivatives of aniline, still more recently discovered by Dr. Hofmann, which may claim the title), if I similarly heat this *nitrate of diazobenzol*, you will find that it will undergo decomposition as soon as the tube has reached the temperature of the water. There we have a very violent explosion; the tube is shattered, and has been thrown out of the water-bath by the force of the explosion. The fulminate of silver has not exploded, but we had better get rid of it. I shall be able to explode it by exposing it to this source of heat [the flame of the spirit lamp], for it explodes at more than double the temperature of boiling water, or about the temperature of melting tin, so that as soon as the tube begins to melt, the fulminate of silver will explode. [The explosion shortly ensued.] We see, therefore, that this fulminate of silver appears far less sensitive, when exposed direct to heat, and more sensitive when submitted to friction, than the derivative of aniline.

A very slight examination into the effects of fulminate of mercury and of gunpowder, employed under the same circumstances, will illustrate the difference in the effects produced by substances which explode with different rapidity. Let me first compare the rate of combustion of those two substances. Here is a small train of fulminate of mercury, and here is a similar train of gunpowder. You observe that the flame travels much more rapidly along the train of fulminate than along the gunpowder. This difference will prepare you to believe that the effect of the two when confined in vessels must be different. Here are the fragments produced by the explosion, in a small shell, of 100 grains of fulminate of mercury; the number (amounting to one-seventh of the weight of the shell) were, however, so small that they could not be recovered after the explosion. Here are the fragments of a shell of the same size exploded by 765 grains of gunpowder. The difference between the size and number of the fragments in the two instances is very striking. In the case of the fulminate of mercury the explosive effect is exerted almost instantaneously in all directions, and the shell is therefore shattered into a very large number of fragments, the force of the explosion being almost entirely spent upon the bursting of the shell; while in the case of gunpowder, the explosion being comparatively gradual in its nature, the force developed is only partly spent upon the fracture of the shell, and is still in course of development when this result is produced; hence, not only are the resulting fragments much fewer and larger, but a considerable projectile force is exerted upon them after their production, and they are consequently scattered to a much greater distance than those produced by the employment of fulminate of mercury.

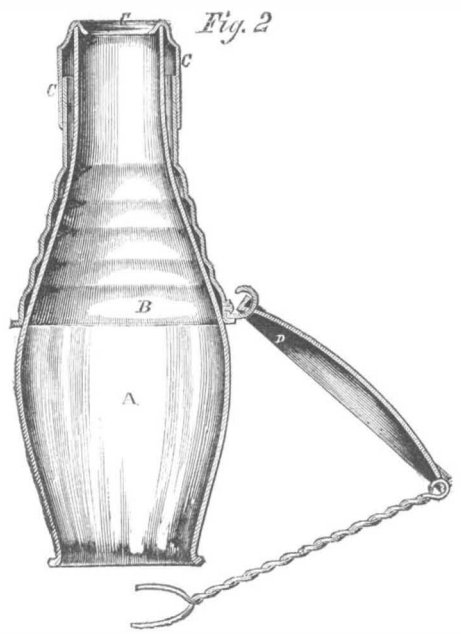
COLBURN'S PROTECTOR AND REFLECTOR FOR GLASS-LAMP CHIMNEYS.

The principal cause of the breaking of glass-lamp chimneys, which occurs so frequently, is the unequal expansion and contraction of the glass. When the

Fig. 1

lamp is first lighted, the upper portion of the chimney, being narrow, is in close proximity to the flame, and it is also exposed to a current of hot air; it, consequently, becomes heated more quickly than the bulb below, and as the heated portion expands while that which is cool does not expand in the same de-

Fig. 2



gree, a fracture necessarily ensues. If glass was a good conductor of heat instead of being one of the poorest known, the heat would be rapidly conducted to all parts of the thin chimney, and the breaking would not occur.

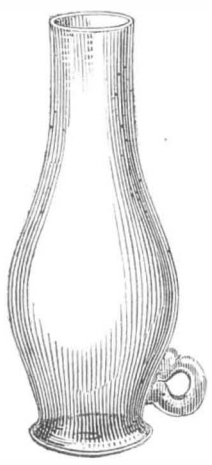
The accompanying engraving illustrates a device for conducting the heat rapidly over the whole surface of the chimney, and thus preventing it from being broken. The upper portion of the chimney is surrounded by a thin cap of tin, or other metal which is a good conductor of heat, and as the upper portion of this cap is heated, it leads the heat downward; spreading it over the glass so rapidly as to prevent the unequal expansion by which fractures are produced.

Fig. 1 is a perspective view of the device, and Fig. 2 is a vertical section. A represents the chimney, and B the cap. The cap is made in two parts, the upper portion, C, fitting upon the lower portion, forming a telescopic joint, so that the length of the cap may be varied to suit chimneys of different hights. The tube, C, has its walls bent inward at the upper end, hooking over the upper edge of the chimney to hold it in place, as clearly shown in Fig. 2.

The inventor says that he has tried this cap thoroughly, putting the chimneys ice-cold upon lamps and raising the blaze to the highest point at once, and that it proves to be a perfect protection even to the cheap unannealed chimneys in common use.

The cap, D, affords a convenient hold for the reflector, D, which is the secured feature in this invention. This reflector has its lower surface concave and plated with firmly-polished silver or other metal of high reflecting powers. It is attached to the lower edge of the cap by a hinge, and is braced to the proper angle to reflect the light downward by a forked wire the lower end of which rests upon the flange at the lower end of the chimney. While this reflector effectually shades the eyes, and throws the light upon the book or work below, it does not cut off the light from the room, as does an ordinary paper shade.

A third improvement in lamp chimney, designed by the same inventor, is represented in this little cut. It is simply the forming of a glass handle upon the chimney near its lower end, for removing the chimney when the lamp is burning. The location of this handle prevents it from becoming heated, and the inventor says that it insures the annealing of the chimney by the manufacturer, as chimneys cannot be made with this handle without being annealed.



Patents for both these inventions have been applied for, and further information in relation to them may be obtained by addressing the inventor, Dr. G. F. J. Colburn, at Newark, N. J. [See advertisement on another page.]

A Remedy for Smallpox.

Dr. Frederick W. Morris, resident physician of the Halifax Visiting Dispensary, N. S., has written a letter to the *American Medical Times*, in which he states that the "Sarracenia Purpurea," or Indian cup, a native plant of Nova Scotia, is the remedy for smallpox in all its forms, curing in twelve hours after the patient has taken the medicine. That "however alarming and numerous the eruptions, or confluent and frightful they may be, the peculiar action of the medicine is such that very seldom is a scar left to tell the story of the disease." If either vaccine or variolous matter is washed with the infusion of the sarracenia, they are deprived of their contagious properties. So mild is the medicine to the taste that it may be largely mixed with tea and coffee and given to connoisseurs in these beverages to drink without their being aware of the admixture. The medicine has been successfully tried in the hospitals of Nova Scotia, and its use will be continued.

Power of Imagination.—In illustration of the power of imgination, the case of the old lady who watched the vane, to see when her rheumatism was going to begin, is not equal to that of the storekeeper, who painted the lower part of his stove red, and saved seventy-five per cent in the consumption of wood thereby during the winter. The illusion was so complete, that one man tried to make him pay for a pair of boots that he had burnt on the stove.

Upward of three thousand applications have been received from young women wishing to be engaged as waiters to the London Exhibition.

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Correspondence.

EDITORIAL CORRESPONDENCE.

Columbus—Its Public Buildings—Artesian Wells—Manufacturing Establishments—Mechanics—Incidents, &c.

COLUMBUS, Ohio, May 25, 1862.

Columbus, the capital of Ohio, is situated in a central position in the State, and in the fertile valley of the Scioto. It occupies the south bank of the river, and, although the position is comparatively flat, it is sufficiently high above the river to afford good drainage. It is a pleasant place; the streets are spacious and most of the houses are surrounded with orchards and tasteful gardens. The population is about 30,000, but the city occupies a very extended area in proportion to this number of persons. It contains signs of much wealth in many elegant mansions, public buildings, and manufactories, but above all in its natural resources and frank industrious people. The chief business avenue is High street, which runs north and south and occupies the crown of a curved ridge which bounds the immediate low land adjacent to the Scioto. This is the seat of the State government, and here are located the State buildings, such as the Capitol, the Lunatic Asylum, Blind Asylum, Deaf and Dumb Institution, Medical College, Penitentiary and Arsenal. The first named building is a very large structure and occupies an elevated position in the center of a large park. It is of the Doric order 304 feet long, 184 feet wide and 150 feet high. The walls are of the white carboniferous limestone which underlies this whole section of country. It is rich in fossils, and as the steps of the Capitol are formed of such limestone blocks, I tread upon the ruins of an extinct world at every step, while ascending to the Assembly Chamber, where the General Assembly of the Presbyterian Church (O. S.) is now convened. This body had some exciting debates and has adopted a paper on the state of the country, which denounces with vehemence rebellion against the government and all those who give it aid and comfort whether found North or South. In this immense building are the Governor's rooms, the Agricultural Department, under charge of J. H. Klippart, Esq., and there is a growing library which now contains 25,000 volumes. Behind the State House is the famous Columbus Artesian bore, 2,800 feet deep. It was sunk with the object of obtaining a large supply of good water for the State buildings. In boring down, several petroleum and salt veins were tapped. With the hope of reaching a vein of good water, the boring was continued to this great depth when a sudden stop was put to all further operations. The boring tool dropped suddenly about six feet and was bent out of its vertical direction. A subterranean stream, or apparently a cascade, had been struck and all efforts to tube it have proved abortive. This is the deepest artesian bore on our continent, but where does this subterranean stream go, flowing as it does at a lower level than the bottom of Lake Erie.

The Columbus Penitentiary is a great manufacturing institution. About 150 hands are employed by Hall, Ayres & Co., in ax handles, fellies, shafts, wheels, and all the parts of carriages—finished and unfinished. The hickory and ash—the two kinds of timber most commonly used in the parts of carriages—are abundant in Columbus. The carriage work executed here is of the best description. About the same number of hands are also employed in this Institution by Hall, Brown & Co., in manufacturing agricultural implements, such as scythe snaths, grain cradles, horse and hand rakes, hoes, &c. All the metal parts of these implements are of cast steel, no iron boing used. It is said to be the largest agricultural implement manufactory in the world. No English steel is used, but a very superior quality made at Pittsburgh, and is sold at ten cents per pound. The materials of these implements are of the best quality and about 7,000 steel hoes and as many pitchforks are made here annually. Most of the operations are performed by machines, some of which are very ingenious. Convicts who are mere laborers can be instructed in a few days to execute excellent and good work with such machines, which work otherwise could not be performed but by very skillful mechanics. Alcott's lathe is used for turning rake handles and Blanchard's for turning spokes. Several of the machines have been invented and improved by John S. Hall, Esq., who seems to be a ruling mechanical and business genius in Columbus. He is a New England man, learned his trade in Monson, Mass., came to Ohio when young, is now a man of wealth, and is much distinguished for his Christian liberality and patriotism.

In another department of the Penitentiary, various kinds of saddlery are made by P. Haydon & Co.; also conical rifle bullets for the army are made by machinery here. The lead is first run into bars, then swedged out of the solid metal by four different operations in as many machines. The bullets are well made but four different handlings are required for each before it is finished. I have also visited the cartridge manufactory in this place, superintended by Mr. Van Buren. The conical bullets made at the Penitentiary are here secured to the paper cartridges, and about 35,000 are manufactured daily, and no less than 1,000,000 are ordered to be sent away next week. Next door to the cartridge manufactory is the foundry and machine shop of Mr. L. B. Davies, who has lately bored and rifled 40 brass 6-pounders for the State of Ohio. The rifling machine used is an improvement over those I have seen East. It cuts the grooves in the gun—in coming out—thus clearing its own way of all chips, which is not the case with the rifling machines that cut while proceeding inward. Mr. Davies is also the inventor of an ingenious propeller which is placed in a long recess in the bottom of a boat and is intended to prevent injury to the banks of canals.

The Ohio Tool Company, in Columbus, is quite a large establishment. It is chiefly devoted to the manufacture of tools for working in wood, such as all kinds of joiners' planes, carpenters' and coopers' tools. Plane-irons are here made by an improved machine, invented by J. S. Hall, and are sent to every State in the Republic. A cam operates a pair of roller dies, and as they rotate, the plane-irons are turned out with extraordinary rapidity. This is the largest plane factory I have ever visited. It is situated on the banks of the Scioto close to the water and is very convenient for receiving coal and other supplies that come up to this place by canal.

The fuel used in this city is Hocking bituminous coal, and costs $1 50 per tun of 28 bushels. It comes from Hocking county and is equal to the best Liverpool coal. It emits large quantities of smoke, and the good people here invite me to call the attention of inventors to invent an improved grate to consume the soot which is a plague in the best regulated households of Columbia. P. Haydon, Esq., has a very large rolling mill here. Hoop, rod and various other kinds of iron are rolled from puddled iron made on the spot. Columbus is certainly most conveniently located for manufacturing purposes, coal iron and steel being obtained at low prices, and the water and railway communication being scarcely surpassed by any other city in Ohio. At present many of the manufactories are not working up to their full capacity, which is especially the case with the Columbus Machine Manufacturing Company. It has excellent tools and great capacity for doing good work. A large number of portable plantation engines were formerly made by this company. Gas retorts, of as good quality as I have seen any where are also cast in this establishment. A considerable business is now doing in it, however, in making railway switches.

About 1,100 secession prisoners are kept at Camp Chase, about four miles from Columbus. I have seen them, and have also visited the army hospital at the same place. The prisoners appear to be well fed, and are an audacious looking set of unrepentant rebels. In the hospital, I beheld the wounded and fevered rebel, and also the sick soldier who had suffered in defence of his government. I saw one poor Union soldier breathing his last and a fair haired boy scarcely seventeen years old evidently dying by inches. Oh! how my heart was made sad by these sorrowful evidences of the cruelty of this rebellion and the awful wickedness and responsibility of those leaders who inaugurated this civil war. The people here are zealous patriots, and as in New York, battalions of soldiers are now marching through the streets on their way to Washington.

The Scioto Valley is beautiful at present. The locust trees are in full blossom; large fields of wheat are in the ear, the rich clover meadows are mingled with purple and green, and nature is arrayed in beauty. Never before have the fields and orchards promised a more bounteous yield, and with God's blessing, this year will afford as bounteous a harvest as that of 1861.

History of Turbine Water Wheels.

MESSRS. EDITORS:—I noticed on page 278, present Vol. of the SCIENTIFIC AMERICAN, over the signature of O. H. P. P., that "the water guides of turbine wheels must be so arranged as to make the water assume a direction coinciding with the rotation of the wheel, and discharge at an angle of 100° to that of the water entering the wheel."

It is generally admitted that the test of the Fourneyron turbine at Lowell, by James B. Francis, was as accurate as any ever made in this country, and when that wheel gave its maximum power the direction of the water leaving the wheel was 58°. The wheel gave 0 7935 useful effect to the power expended. O. H. P. P. asserts that "the Messrs. Parker were the first and original inventors of the turbine water wheel." It is said their experiments were begun in the year 1824. In the year 1820 Mr. Edward Wells built a water wheel on the same principle as the Duval turbine, which he put into a fulling and carding mill for Henry Holberton, at Richmond, R. I. When Wells commenced his experiments I know not, but he made a model and experimented upon it previous to his building the wheel for Holberton.

JOSHUA A. CLARKE.

Cohoes, N. Y., May 29, 1862.

[We present the above short letter on this subject, suggesting to our correspondent that if he is depending upon memory for his dates they may not be reliable. The Messrs. Parker obtained a patent for their improvements, and we understand it withstood the test of severe legal scrutiny in several instances. It is now public property.—EDS.

Complaints Against the Gas Companies.

MESSRS. EDITORS:—I observe that among the many scientific subjects very ably brought to public notice through the columns of your paper, is that of light. The city, by contract, is entitled to three feet of gas per hour for each lamp. Is that quantity given? I think it may safely be assumed that not more than half that quantity, if as much, is furnished, and hence the prevailing darkness on our borders at night. Gas companies are enriched, the people are impoverished and dwell in darkness. Ought not gas companies to be brought to order? That they should is the general impression. WATCHMAN.

New York City, May 29, 1862.

[We have no personal knowledge of the facts to which our correspondent refers, but we presume he is correct in his allusion to the "prevailing darkness" in many streets during dark nights. This probably is not owing so much to the quantity of gas furnished, as to its inferior quality. We have noticed at our residence lately that three burners do not emit as much light as two do usually, which is no doubt owing to the inferior gaseous qualities of the coal from which it is made.—EDS.

The Backlash in Saw Mills.

Messrs. Editors:—Why is it that nearly all single geared saw mills, working by cogs, work too much on the backside—what I call a backlash? I think the difficulty is in the flywheel and balancing. Is it right to put the balance opposite to the crank, and as heavy as the saw frame and crank. Will some of the experienced sawyers or millwrights among your readers tell me how to overcome this difficulty?

H. F.

Siegfried's Bridge, Pa., May 28, 1862.

GROUND RICE CAKE.—Break five eggs into a stewpan, which place in another containing hot water; whip the eggs for ten minutes till very light, then mix in by degrees half a pound of ground rice, six ounces of powdered sugar; beat it well; any flavor may be introduced; pour into the buttered pan and bake half an hour.

THE minutes of the Conference of the Methodist Episcopal Church and other official sources, show that there are 322 clergymen of that body in the loyal army.

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RATS.

A sportsman contributes to the London *Farmer's Magazine* an interesting article on rats, from which the following is condensed :—

I have heard some men say rats do not attack game ; but that notion is erroneous. In my opinion they do as much mischief as any other vermin in the fields, and will attack young rabbits, leverets, and patridges, whenever they can, particularly just after the fields are cleared of the corn, when their appetites become sharpened.

Rats have frequently been the subject of very interesting description with members of learned societies. For instance, in vol. XI. of the "Trans. Linn. Soc.," 1815, is an interesting description, with engravings, of the genus *Mus*, belonging to the section of pouched rats, by John Vaughan Thompson, Esq., F.L. S. It appears that this anomalous rat is a native of the island of Trinidad, where it is understood not to be very uncommon, although it appears that, during the space of ten years' residence there Mr. Thompson met with only two specimens. He describes it as of the habit and size of the common rat ; the nose rather sharper, the ears naked and rounded and of moderate size. The feet have six callous tubercles beneath, are all five-toed, the innermost toes or thumbs, extremely short and small, the whole armed with sharp claws, those on the exterior and interior toes being small in proportion ; tail about six inches long, scaly, with a few scattered setose hairs. The two upper teeth are placed without the *rictus* or opening of the mouth, which is not larger than to permit a grain of Indian corn to pass through it. The cheek pouches are formed by a duplicate of the common integuments, open below, extending from the base of the upper teeth to the throat and as high as the eye and ear. These cavities are lined throughout with scattered whitish hairs, and formed in the same manner as the abdominal pouch of the *Didelphus*, and not at all in the way described by Buffon of the hamster (*Mus cricetus*) and the other pouched rats hitherto discovered. The body is covered with fine lanceolate spines, declining toward the throat and belly into a coarse setose hair, and everywhere intermixed with a finer sort of hair. The whole of the upper parts of this rat are of a purple-brown color ; the lower part of the cheeks, throat, inside of the limbs, belly, and under-half of the tail are white ; and the upper half of the tail is nearly black.

It appears that the habits of this remarkable rat are singular and curious. Where they are numerous, they do incalculable mischief in barns and granaries, when, not content with what they can eat on the spot, they stow away and carry off in their cheek pouches quantities of grain, which they deposit in their retreat, for "hard times," or when food is not so easily procured.

In volume VII. of the "Trans. Linn. Soc.," 1804, is a description of a monster species of rat, a native of the East Indies, by Capt. Thomas Hardwick, F.L.S. It is, however, the same species as that mentioned by Pennant in his "History of Quadrupeds." The description in the "Trans. Linn. Soc." is accompanied by a very good engraving, in full-sized figure, of this peculiar animal, which is the largest of the known species. It is, however, not exclusively belonging to the coast of Malabar, but is better known in natural history as *Mus giganteus*. The weight of the rat from which the drawing was made was 2 lbs. 11½ oz. Its total length 26¼ inches, of which the tail measured, from root to tip, 13 inches. The specimen described was a female ; the male grows to a larger size, and weighing 3 lbs. and upward. This species is found in many places on the coast of Coromandel, in Mysore, and in several parts of Bengal between Calcutta and Hurdwar. It is partial to dry situations, and seldom found far from the habitations of man. The low caste Hindoos eat the flesh of this rat with much relish. It is one of the most mischievous of the whole of the rat species ; it burrows to a great depth, and will in this way force an entry under the foundations of granaries and storehouses. Mud or unburnt brick-walls prove no security against its intrusions ; and it commonly perforates such buildings in all directions. In gardens it is equally destructive, rooting and burrowing after the seeds of all leguminous plants sown within its haunts. Cucurbitaceous plants and fruits also suffer by its depredations. And when grain and vegetables are not to be had, it will attack poultry.

The bite of this animal is dangerous ; indeed Capt. Hardwick mentions an instance of hydrophobia ensuing where a European officer in the Hon. East India Company Artillery, while stationed in Futteghur, died under a confirmed hydrophobia, in about twelve days after having been bitten by one of these rats.

Rats have sometimes been the subject of a special treatise. A work was published in the year 1768, called "The Universal Directory for taking alive and destroying rats, and all other kinds of four-footed and winged vermin, in a method hitherto unattempted ; calculated for the use of the gentleman, the farmer, and the warrener ; by Robert Smith, Rat catcher to the Princess Amelia!" Thus we find that a rat-catcher was formerly a distinguished personage.

The author of the work alluded to first enters upon a long discussion on the Norway rat, which, he says, was originally brought from that country to England in ships trading for timber ; he also states that this rat is sometimes erroneously termed the Hanover rat. He says there are few buildings either in town or country that are not pestered with them,

We suggest that in order to discover the places where they intrude, some fine sand should be sifted about, by which means their foot marks may be easily traced. This, as we have often heard, is an infallible method by which to betray all sorts of four-footed vermin, and indeed many a two-footed thief has been detected in the same manner. These Norway rats are very prolific, bringing forth twelve young ones at a time, and breeding three or four times in the course of a year.

We have then another book on the subject of rat catching, published in the year 1789, called "Directions for taking alive or destroying rats and mice, either in houses, ships, mills, farms, &c., by a method hitherto unattempted ;" by John Middleton, late of Walthamstow. Printed for the author and sold by him at Stratford Green, Essex. This is the best of all the old treatises ; there is no gammon about it. Though now long out of print there is no modern treatise on rat catching to be compared with it. After a well-written introduction, the author says :—"One doe rat will breed about three times in a summer, and seldom bring forth less than twelve young ones at a litter. I have taken fifteen young ones from a doe rat, and have found several does with the same number."

He does not approve of poisoning rats in dwelling houses, because, in addition to the danger incurred by laying poisoned food about where there are children, dogs, poultry or other tame creatures, there is the unendurable stench, for several weeks, of dead putrid rats, which lie under floors and between walls, to the disgust and annoyance of every inmate of the house. He recommends the use of the hutch trap as by far the better means of extirpating the premises of these vermin. It should be set in the following manner :—Set the back part of the trap close to the wall, so that the rats cannot run behind it, and about eighteen inches from the hole or run, where they come in at ; then tie or confine the falls of the trap so that it cannot go down ; and leaving them about half up, or rather higher, so that the rats may pass under the flap with ease ; then take two small bundles of clean straw, tie them up tight, and place one at each end of the trap ; this prevents their having any notion that it is a trap ; let the bundles of straw be about two feet long and as big as a small wheat sheaf, setting them aslant against the wall and before the mouth of the traps. Never set two traps in the same quarter ; by so doing you prevent their coming to either. Never remove a trap after the rats have once taken to it, for that makes them shy. Rats are more likely to enter freely when the traps have contracted a smell from the dung. They will seldom enter a new trap until they have been accustomed to it a few days. Hence appears the impropriety of washing the traps as is frequently practiced by some people, in order to take off the scent. A trap should never be washed.

If it be intended to hunt the rats taken alive, they must be put into a store cage ; but keep them out of the hearing of those which are not caught. It is a rule with rat catchers to look to their traps very frequently ; and when the rats are very numerous, the trapper sits up all night to attend to his traps ; he is then within hearing, and directly he hears a trap sprung, goes to it and takes out the rats, or turns them into the store cage.

The next day you may fearlessly put your hand into the store cage and take the rats out, one at a time, and turn them to your dogs, as they will not make the least attempt to bite when they have been kept in the cage all night ; it greatly terrifies them, and particularly if they see dogs or people about them, when they always endeavor to screen and hide themselves. There is no occasion to dress your hands with any scent or dung ; such is a fallacious notion and of no use. When you take the rats out of the cage lift them by the tail and turn them among the dogs. The best time for taking rats is the first two or three quiet hours of the night, after the good people are gone to bed. It is always difficult to poison rats in barns, corn stacks and granaries, because they live so well that they will seldom be tempted to eat the poisened bait. By far the better plan is to trap them, and where the animals are numerous the hutch traps are the best ; ten and twenty times more may be taken in these than in the iron traps, which catch only one at a time, whereas some of the others take ten or a dozen at a time. For catching water rats the steel traps are to be preferred ; these should be set in the earth near their holes, being placed in cavities dug out so as to fit the trap exactly, and bring it level with the surface, covering it over lightly with dust or grass. The oils used by rat catchers for the purpose of mixing with the baits and enticing the rats to the traps, are oil of carraway and oil of rhodium, sometimes both mixed together ; rats are very fond of the scent of these oils.

Rats feed, frolic and fatten in the dark ; they prefer night to day, and are so wary of the approach of human form that if we enter a barn or granary where hundreds dwell, none will be seen, unless disturbed or driven from their hiding places.

Embalming the Dead.

A Washington correspondent gives the following account of the process of embalming :—

The body is placed on an inclined platform, the mouth, ears, nose, &c., are stopped with cotton ; if wounded, cotton is put in the wound, and a plaster is put on ; an incision is made in the wrist, the attachment is made from an air pump, and fluid is ejected into the arteries. The wound is then sewed up and the body is hoisted to dry. To save the eyes from sinking in, wax is put under the eyelids The hair is found to come out very easy, but after the embalming it could not be removed. The bodies take on an average about seven quarts. There were some eight bodies on hand ; some had been there thirty days. The operators say that in four months the body will become solidified like marble, but no change has yet been had to prove it. Colonel Baker's body, on arriving at San Francisco, was in an advanced state of decomposition. Dr. Holmes, late of Williamsburg, Long Island, is the oldest in the business here, and I am informed he has made $30,000. Messrs. Brown & Alexander are trying to get a bill through Congress for the exclusive right to embalm bodies, and to have Congress authorize a corps of embalmers for each division. The charges are $56 for an officer and $25 for a private, and I must say the bodies are as life-like as if they were asleep.

THE HOG CROP.—The exports of cut meats to all foreign countries from Boston, New York, Philadelphia, Portland and Baltimore, from November, 1, 1861, to April 16, 1862, and the corresponding time the previous season, were as follows :—

Years.	*Pounds.*
1860–61	57,682,202
1861–62	151,370,325
Increase this season	93,688,123

The exports of lard for the corresponding periods were—

Years.	*Pounds.*
1860–61	23,443,750
1861–62	81,411,550
Increase this season	57,967,800

THE Commercial Bank of Canada has obtained a verdict for $1,100,000 against the Great Western Railway Company, for money furnished for the completion of the Detroit and Milwaukie Railway, it being held that the Great Western Company was the real creditor in the transaction.

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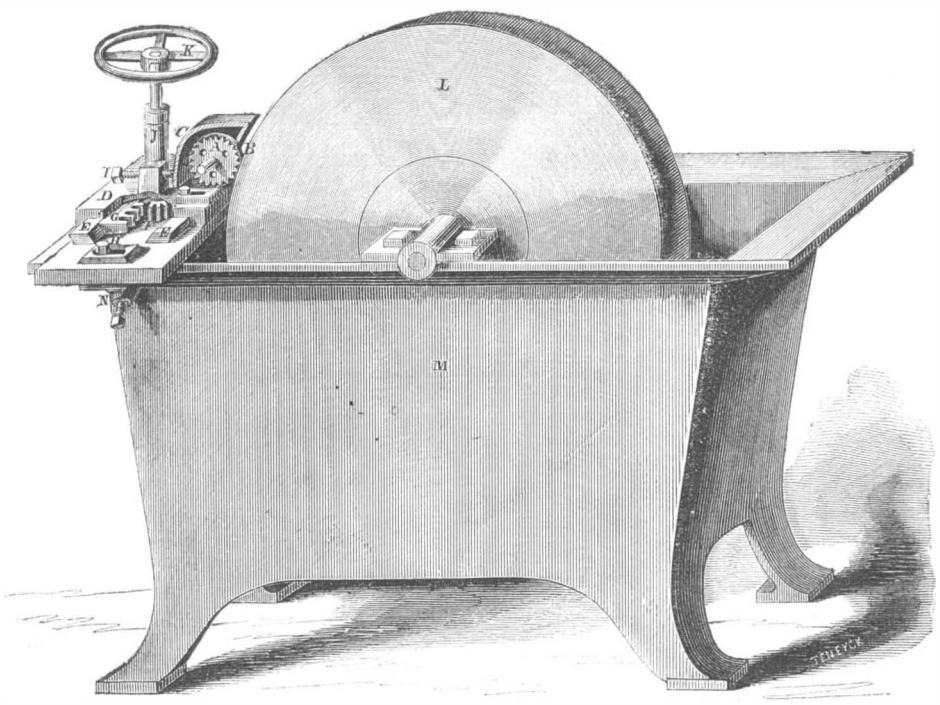
Improved Rotary Machine for Sharpening Grindstones and Turning them True.

Grindstones are seldom homogeneous throughout, but are softer in some places than in others, and they are consequently worn by use out of circular form, which renders it necessary to turn them down occasionally. This is usually done with a hardened steel rod while the stone is dry. This consumes a great deal of power, and fills the air with a sharp dust exceedingly injurious to the moving parts of adjacent machinery. It is also the practice to hack the faces of grindstones with sharp hatchets, in order to make them grind more rapidly.

The accompanying engraving illustrates an apparatus invented by John F. Schuyler, of Philadelphia, for keeping grindstones constantly true and sharp, which operates while the stone is wet and in use, thus avoiding all dust and all interruption of the work. It consists of a wheel with sharp and hard steel points, secured between two india-rubber disks on the same axle, so connected with mechanism that it may be caused to traverse across the face of the stone whenever its use is required. The india-rubber disks are a little larger than the cutting wheel, and as they are pressed against the grindstone they are caused to rotate, thus turning the cutting wheel, while at they sametime they yield sufficiently to allow the points to enter the face of the stone.



SCHUYLER'S ROTARY MACHINE FOR SHARPENING GRINDSTONES AND TURNING THEM TRUE.

The engraving represents one of the washers removed, so as to show the cutting wheel. A is the cutting wheel, B the washer beyond it, C the farther side of the case, which has the bearing of the shaft of the wheel, A, and O the top of the case. The apparatus is secured to the box, M, of the grindstone, L, by means of the clamp screw, N, with the points of the teeth just in contact with the face of the stone in the highest parts. The cutting wheel is hung in a carriage, D, which slides on ways, E, along which it is made to traverse back and forth by means of the hand-wheel, K, which carries upon the lower end of its shaft the pinion, F, meshing into the rack, G. The points of the wheel, A, cut down the face of the stone in its highest parts, and at the same time give it that roughened surface which is best for grinding. As the stone is cut away, the wheel, A, is fed forward by the screw, I.

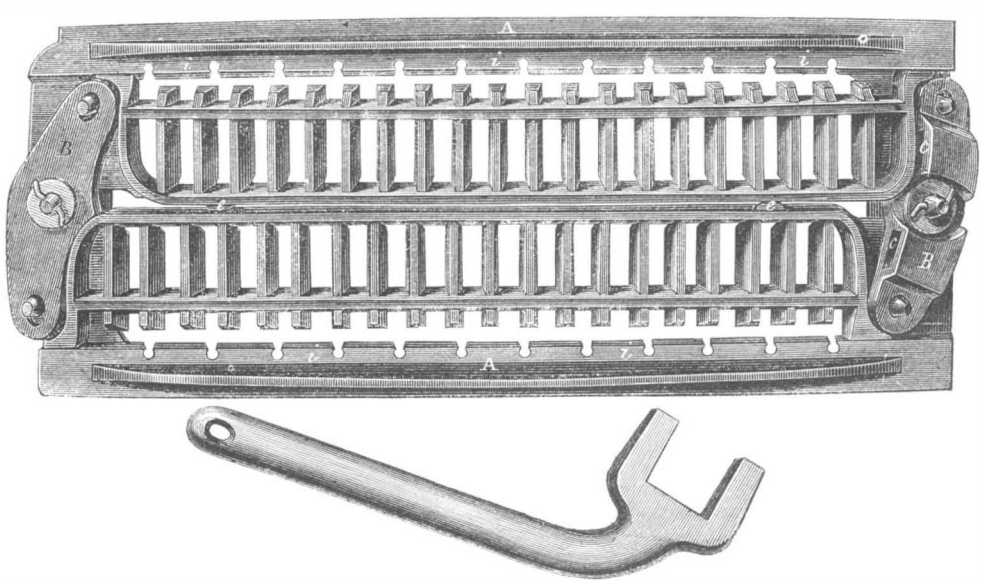
This apparatus has been in daily use for some time in the largest saw factories and machine shops of Philadelphia and other cities, and is found to work satisfactorily.

The patent for this invention was granted June 5, 1860, and it has been assigned to George C. Howard, engineer and machinist and manufacturer of machinists' and tools, who may be addressed for further information in relation to it, at Nos. 13, 15 and 17 South Eighteenth street, Philadelphia.

Improved Vibrating Grate.

The grate here illustrated is designed to facilitate the shaking of the coals while they are in the grate and on fire, so as to sift the ashes from them; and certain peculiarities are introduced in its structure to prevent it from being warped by the intense heat to which grates are exposed.

The engraving represents the grate as turned up in a vertical position, the moving parts not being visible when it is viewed from above. The frame, A A, formed of a single piece of cast iron, is set in the brickwork of the fireplace in a horizontal position, so that the side which is turned toward the spectator in the engraving will be the lower side. The grate is formed in two parts, which are attached to the frame by the vibrating levers, B B. In one of these levers slots, *c c*, are formed for the entrance of the jaws of the wrench, D, by means of which the levers may be vibrated, and thus a reciprocating motion may be imparted to the two parts of the grate whenever it is desired to shake the coal in order to sift the ashes from out the fire.



BROWN'S VIBRATING GRATE.

The pivot pins by which the levers are attached to the frame are cast upon the frame, and the pins by which the two parts of the grate are attached to the levers are cast upon those parts, so that all of the apparatus, except the keys through the pins at the fulcra of the levers, are of cast iron, and but few pieces of iron are employed. To secure a rectilinear motion to the two parts of the grate, these parts are confined by lugs, *e e*, cast upon their adjacent edges; and the pivot holes in the ends of the levers are elongated to permit the vibration of the levers, notwithstanding the motion of the grate is thus circumscribed.

The longitudinal plates, A A, of the framing have, at the inner edges of their upper sides, ribs—reversible in the engraving—and these ribs are caught up at intervals by the notches, *i i*, which permit the edges of the plates to expand to suit all the variations of temperature, without warping or bending the frame from its normal form.

The inventor states that this grate has been thoroughly tried, and that it gives the most perfect satisfaction. The ashes are readily sifted from the coal, either before the fire is kindled or while it is burning, and the notches in the frame effectually accomplish the purpose for which they are designed.

The patent for this invention was granted through the Scientific American Patent Agency, March, 25, 1862, and further information in relation to it may be obtained by addressing the inventor, Albert Brown, at Troy, N. Y.

Steam against Horses.

In some of the cities in England and Scotland, where large engineering establishments require heavy loads to be drawn to a considerable distance, traction steam engines are now being employed. In Glasgow, for example, it has become a common thing to see a steam engine hauling huge pieces of mechanism through the streets to be shipped on board of vessels in the river. Lately the hull of a small iron screw steamer was drawn a distance of one mile and a half from the place where it was built, and launched in the river Clyde; and a few days afterward a huge steam boiler, weighing 30 tuns, was drawn a distance of about half a mile in fifteen minutes, with the same engine, to be placed on board of a steamer. It would have taken 30 horses or 300 men, one hour's labor, to have moved this boiler the same distance. It appears to us that an engine of this character would be very useful and would find plenty of employment in any of our large American cities, in drawing blocks of stone, heavy castings, &c. We lately saw a huge 10-inch navy gun lying on the pavement in Markct street, Philadelphia, about a mile from the place where it was to be taken, and it had been thus lying for several days owing to the difficulty experienced in drawing it through the city by a long train of mules and horses. A single traction steam engine of the power of the one used in Glasgow, could have drawn three such guns the distance required in half an hour. We trust this important subject will receive the general attention which it deserves.

Ludlow's Valve.

The inventor of this valve informs us, in a note, that the spring, though desirable is not absolutely essential when the valve closes upward, as we stated in our description, on page 360 of the current volume. Hence the valve will work even if the spring should be broken. He says also that a long stem may be dispensed with by passing the stem through the gate and wedge.

THE banks of New Orleans paid off their depositors as far as practicable in view of the surrender of that city, those who were entitled to specie receiving it, and those who had deposited Confederate scrip receiving their pay in that currency, the remainder of the coin having been sent with their important books and papers to Columbus, situated at the head of navigation on the Tombigbee river, 140 miles northeast of Jackson.

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NEW YORK, SATURDAY, JUNE 14, 1862.

THE TROY FIRE AND IRON-PROOF SAFES.

The Troy *Times* in commenting upon the remarks of our correspondent respecting the late fire in that city and its action upon iron safes which appeared in the Scientific American two weeks ago, charges that our correspondent intended to make a thrust at Mr. Lillie, whose safes are extensively made in that city.

We beg to assure our cotemporary that our correspondent is a high toned gentleman, having no other interest in the matter than to elicit the truth, and in no way concerned either in the manufacture or sale of safes.

In conducting the Scientific American we are not in the habit of accepting without proper reservation the statements of interested parties in matters which are liable to become the subject of dispute. Our correspondent had no intention to reflect upon the Lillie safe—of this we are perfectly assured.

In the communication referred to our correspondent uses the following language: "Hardly a safe *standing out uninclosed by brick* has passed through the fiery ordeal." This is really the point of his observations, and how is it sustained by the facts? One of the Troy papers says: "Most of the safes were subjected to *an intensity of heat, and for a length of time*, which no safes were ever made to withstand, and against which no safe manufacturer, in his senses, would warrant his to pass through with contents uninjured. The result of the most rigid inquiry and investigation will show, we think beyond a doubt, that no safes in the fire came out less damaged than those of Lillie's manufacture."

This confirms in substance our correspondent's advice, that too much dependence should not be placed upon the perfect fire-proof qualities of any safes. In cases of intense heat, and when not encased in brick-work, they are liable to be destroyed. The Troy *Times*, in its criticism of our correspondent's communication, admits that iron safes (not Lillie's) supposed to be fire-proof, "were burned up, and, as a matter of course, not the least vestige of anything valuable, that was in them, was saved from the flames." Fire is a powerful element, and has often baffled the wit and wisdom of the most ingenious of mankind in attempting to stay its ravages. And we but do our duty as public journalists when we advise the public to be cautious in guarding against its power. We have friends, almost under our eye, as we now write, who lost nearly $200,000 worth of securities by confidently relying upon the protection which they reasonably supposed to exist in a fire-proof building, and an iron safe.

INVENTORS LOYAL.

It has afforded us the greatest pleasure to notice the patriotism and loyalty to the government of the great body of our inventors. Thousands of them are serving in the army and navy, as soldiers, seamen, engineers, artisans and mechanics, and their labors have been of great benefit to both branches of the public service. As our army advances, and liberates them from the grasp of tyranny and oppression, this class of our fellow citizens in the rebellious States, prove their devotion to the old flag. Already we have letters from our former patrons in New Orleans, and from portions of Tennessee and Virginia, which give unmistakable evidence of their patient devotion to their government and country. This is very gratifying to us; it bears out our former impression that no more loyal class of citizens could be found than our inventors.

EMPLOYMENT OF FEMALES IN INDUSTRIAL OPERATIONS.

The employment of females in industrial operations has the same effect on the wages of male mechanics and laborers as the use of labor-saving machinery. If a people is so savage as to till the earth with their naked hands, and to spin the material for their clothing by twirling the thread between the thumb and finger, they cannot be as well fed and clothed, as they could if their agricultural operations were conducted with the aid of cast-steel plows and reaping machines, and their manufactures had the service of steam engines and all the complex mechanism of modern civilization. Men labor in order to provide for themselves wealth in all its forms—food, clothing, houses, fuel, horses, books, &c. Gold and silver coin is used merely to effect the exchange of the surplus products of one man for the surplus produced by another. The amount of wealth which any people produces depends wholly upon the effectiveness of the tools with which they work, and on the constancy and skill with which these tools are used. A manufacturing establishment filled with looms and spinning frames is just as really a tool as an ax or a hoe. All forms of active capital are really tools in the hands of laborers.

The more abundant and excellent the tools with which any people works, the larger will be the product of wealth to be divided among the individuals. Consequently, the wages in any country are almost exactly in proportion to the amount of labor-saving machinery which it employs. In Hindostan, where cloth is woven by hanging the harness on the limbs of a tree, wages of able bodied men are two and a half cents a day, while in this country, where labor-saving machinery is most freely used, wages range from ten dollars a month upward. Sixty years ago, before the introduction of the power loom and the steam engine among us, the regular wages for men was about seven dollars per month in the average, and excellent seamstresses were hired for forty cents per week.

Now, the effect of having half of the community idle is precisely the same as the effect of working with poor tools; it diminishes the aggregate product of wealth, and there is consequently less to divide among individuals; in other words wages are lower. Those English, Scotch and Irish mechanics who protest against the employment of females in industrial operations, for fear that it will diminish their own wages, are just as foolish as their brother mechanics who object to the use of labor saving machinery.

We are very proud of the fact that so few American mechanics—the graduates of our public schools—fall into either of these delusions. They do not get up mobs to break steam engines in pieces, neither do they organize strikes because girls are employed in the shops. They are quite willing that the roughest and hardest labor should be performed by the iron arm that never tires, and in the more delicate portions they welcome the proffered aid of woman. There is a manliness, too, engendered by our free institutions, that prompts all classes of our people to bid defiance to competitors. We recently heard a broad shouldered, six-foot printer remark, "If I cannot make a living in spite of the competition of women, I may starve, but I do not believe that I shall complain."

PROGRESS OF OUR IRON-CLAD FLEET.

Three large and splendid impregnable war steamers, on the plan of Ericsson's *Monitor*, are nearing completion in this city. The builder is Thomas F. Rowland. These vessels will be finished on the stocks, and they are to be launched about the first of August. Three other boats of the same kind are building at Boston, Mass., two at Chester, Pa., and one at Wilmington, Del., making nine in all.

In addition to these, the government is building several other iron-clad vessels of the strongest character, so that we shall soon be in possession of an iron-clad fleet that will be able to compete with any of the naval powers of the world.

It will not be long before every harbor and river of rebeldom will be fully commanded by these terrible messengers of destruction. With all the vital points and avenues of their territory patroled and penetrated by the Union iron-clads, it would appear certain that the secessionists will at best have a very brief and uncomfortable existence.

CAPT. NORTON AND THE SCIENTIFIC AMERICAN

Last week we published a plan for blowing up iron-clad ships, and by the last arrival from Europe we find precisely the same plan suggested by that fertile inventor, Capt. J. Norton. His plan was published in *Saunders's News Letter and Daily Advertiser*, of Dublin, and the paper with the article marked and directed to the Scientific American, was on its way across the Atlantic at the very time that our article was going through the mails to our subscribers. To show how exactly alike the two plans are, we publish Capt. Norton's letter:—

To the Editor of Saunders's News Letter:—*Sir*—As the Emperor of the French and the American government are enthusiastically turning their attention to the best means for sinking iron-clad men-of-war, I propose to do it by having a powerful iron-clad ram, provided with a long iron pole, to be shipped to the stem of the vessel under water at the line required; at the point of this pole I would attach a shell or caisson, charged with the most approved fulminating powder, and the invulnerable ram would push its pole under the bilge of the *Monitor*, in its weak wooden bottom; I would pull a string, which would instantly fire the shell by friction, and give the *Monitor* and all in it a cold bath. I am ready to practically prove my *modus operandi* to all taking an interest in such an easy way of disposing of an invading enemy.

Yours, &c., J. Norton.

Howard's Hotel, Kingstown, May 15.

THE NEW IRON STEAMER "SCOTIA."

The new steamer *Scotia*, the latest built of the Cunard line, has been here for two weeks, and departed the 4th inst., on her first return voyage to Liverpool. Considerable interest has been attached to this steamer on account of her being the largest merchant vessel afloat with the exception of the *Great Eastern*, and also because she is the latest effort of the celebrated engineering firm of Robert Napier and Son, of Glasgow, Scotland. She is built entirely of iron, and is a paddle-wheel steamer. Her tunnage by builder's measurement is 4,050 tuns; the length of keel and forerake is 360 feet; length over all, 400 feet; breadth, 47 feet; depth, 32½ feet. She exceeds the *Persia* in capacity by 450 tuns. When loaded to 22 feet she displaces 6,500 tuns. Immense in size as the *Scotia* is, she is so well proportioned and sits so gracefully in the water that she does not appear to be such a large vessel as she really is. Her engines are two in number and are splendid specimens of mechanical skill; they are rated at 883 nominal horse-power, but are capable of working up to 3,000 united horse power. They are of the old side-lever pattern, with several new attachments. The valves used are Waddle's (engineer of the *Persia*), balanced double port D-slide kind. Each of the steam cylinders is 100 inches diameter by 12-foot stroke—two ft. longer than the engines of the *Persia*. The pressure of steam carried is 25 lbs., and it is superheated to 318° Fah. Two superheaters are employed; each has 14 pipes 16 inches diameter and 9 feet in length. The flame from the furnaces passes through these pipes, while the steam flows around them on its way to the cylinders. The superheaters can be disconnected from the boilers at any moment by a valve. The saturated brine water, in being discharged from the boilers, passes around a series of pipes, while the cold feed water goes through them on its way to the boilers. By this arrangement the feed is raised to about 150° before entering the boiler. Four large tubular boilers, having 40 furnaces, are used. The main intermediate shaft between the two engines is 31 inches in diameter; the side levers (inverted beams) are each composed of two plates of rolled iron 22 feet in length, 7 feet wide at the middle and 2½ inches in thickness. The rolling of these immense plates was a work of great difficulty. Only one firm in England would undertake the task, and out of the first eight plates that were rolled, seven were rejected on account of defects. All the parts of these engines are massive; some idea may be obtained of the size of their parts by stating that one of the slide valves weighs no less than two tuns. The paddle wheels

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are 40 feet 8 inches in diameter; and she is provided with Silver's marine governors. Two small donkey engines, two hoisting engines and one steam pump are used on board. The coal bunkers contain 1,800 tuns of fuel. A government safety valve is attached to each boiler, and is locked up from the engineers. It is examined at Liverpool by the Surveyor of the Port under the Board of Trade.

The *Scotia* is of unusual strength; her keel plates are $1\frac{1}{16}$ inches in thickness; the bottom plates are $\frac{15}{16}$ of an inch; thence up to the load line $\frac{7}{8}$-inch plates, and above this $\frac{13}{16}$-inch plates. The framing is composed of ponderous bars and angle iron welded and riveted in the most perfect manner. She is divided into seven water-tight compartments, and carries 1,500 tuns of merchandise in two water-tight tanks 75 feet by 20 in length and 20 feet in depth. There are 157 state rooms, with sleeping accommodations for 300 cabin passengers. The main saloon is 62 feet in length by 20 feet in breadth, and is 8 feet high. The decorations of the staterooms are tasteful and elegant.

Every thing about this great steamer gives indication that her owners have spared no expense to make her the most perfect passenger steamship ever built.

RECENT AMERICAN INVENTIONS.

Breech-Loading Cannon.—The principal object of this invention is to obtain a gun in which gun cotton may be used, and which will therefore be particularly serviceable in casemates and between the decks of ships, as the use of gun cotton, owing to the little smoke produced, does not cause the choking thirst, smothering sensation or blindness in the men working the gun in a confined place. Owing to the danger of loading at the muzzle with gun cotton, the breech-loading system is adopted, and the improvements are more particularly directed to the strengthening of the breech and its connections and the surrounding parts, to produce a breech-loading gun of the requisite strength. One improvement consists in fitting the chamber of a breech-loading cannon with a stout tube of steel or other tenacious metal, termed an internal reinforce, the interior of which is much smaller than the caliber of the gun and the length of which is sufficient to enable it to contain the charge. The object of this tube is to strengthen the gun and also reduce the amount of the area of the breech that is exposed to the force of the explosion. Another improvement consists in a novel mode of locking and tightening up the breech, whereby the joint between it and the chamber is made very secure and close. A Third improvement consists in a novel priming and firing apparatus. This gun may be used with gunpowder as well as gun cotton. The breech-loading arrangement is very secure and strong. The invention is patented by E. R. McCabe, of Rochester, Iowa.

Iron Plates for Vessels.—This invention, patented by Edward Cox, of Covington, Ky., relates both to armor plates applied on the outside of wooden hulls and to iron plates attached directly to the frame of the vessel, the frame being either of timber or iron. It consists in an improved mode of fitting together and combining the marginal portions of the several plates, whereby they are so locked as to hold each other both in a direction lengthwise of the vessel and in a vertical direction, and to assist in holding each other to the sides or frame of the vessel and in strengthening the vessel, and the necessity of using plates of very large size is obviated. A patent has also been taken in England on this invention through the scientific American patent agency.

Piston Packing.—This invention consists in the arrangement of spring valves and guides in combination with apertures in the piston head follower, in such a manner that the apertures admit the steam or other fluid from the cylinder into the piston, and are instantaneously closed on reversing the piston, and the steam or other fluid can effectually be employed to produce a tight and reliable packing; it consists further in the arrangement of an additional packing ring on the inside of the ordinary main packing rings of the cylinder, said additional packing ring being provided with a toothed expansion rack and with a spring plate, in such a manner that by the action of the steam or other fluid, the inner packing ring is expanded and the device between the outer or inner packing rings is effectually closed, and by the spring plate the steam or other fluid is prevented finding its way in between the inner and outer rings. The patentee is P. L. Kreuter, of Bloomington, Ill.

Machine for Making Candles.—This machine consists of a horizontal rotating table divided radially to its center into any number of equal sections, each one of which has secured to it a rack for the reception of the molds, and on one side or in front of which is situated a series of spools from which, and through a perforated board, the wick is supplied to the molds when the latter are brought opposite to them by the rotation of the table. The molds are divided vertically and centrally for the reception of the wicks and the removal of the candles, clamps being used to receive the wicks from the spools for their introduction to the molds, and to retain them there before and during the pouring in of the tallow or other material. Andrew Black, of New York City, is the patentee.

GIFFARD'S INJECTORS---THE MACHINE BUSINESS IN PHILADELPHIA.

While in Philadelphia for a few hours last week, we made a brief visit to the extensive machinery manufacturing establishment of Messrs. Sellers, and found, to our surprise, that they never were more busily employed in the manufacture of lathes, planers, and all the various machines that are employed for making the parts of engines, and machinery for general manufacturing purposes. We consider this a good indication of the wonderful prosperity and activity of our manufacturing operations amid the conflict now existing in our land. This firm has manufactured about 1,000 Giffard's injectors, about half the number of which were for stationary engines, and the others for locomotives. These ingenious boiler feeders are now employed, to some extent, on almost every railroad in our country.

We noticed a very simple and beautiful arrangement of frictional gearing applied to a new lathe in this establishment. Instead of using a complicated train of toothed wheels to obtain different speeds, any speed required was obtained by the use of three frictional plate wheels, placed one above the other. By moving any of these wheels nearer to or farther from the center of the intermediate wheel, the speed was varied accordingly. The middle wheel is composed of two circular plates, the upper and lower ones of single plates, fitting into the middle plate wheel as into a deep groove.

Inventors Relating their Experience.

Persons who are about to secure Letters Patent, and have not decided upon the Agency they will employ to transact their business, are recommended to read the following letters received at this office within a few days. The experience of these inventors may be a guide to others who have Letters Patent to secure :—

MESSRS. MUNN & Co.:—I have just received my patent, and a better-pleased fellow than I am you never saw. The specifications are just what I wanted: I could not have described the machine as well myself. Your work is well done in every respect, for which receive my thanks.

Yours, truly, W. T. ABELL.

Vernon, Iowa, May 25, 1862.

MESSRS. MUNN & Co.:—*Sirs*—Yours of the 17th was duly received covering official notice from Washington that my application for a patent has been allowed. Permit me to express to you my sincere thanks for the fidelity and open-hearted manner in which you have conducted yourselves toward me and the efficient manner you have performed my business. I now know there is one Patent Agency in which I can place implicit confidence—a fact I have heretofore believed to be fiction. When I made the application for a patent on my Aerial Machine through your Agency, it was with the determination that it should be the last time I should be swindled by Patent Agents. And when I received the specification for examination and signature I could not but notice the great contrast between the plain simple style in which it was prepared with those I have received from other Agencies. I thought if I was to be deceived again (which I expected), it would be in a new style by which, at least, I should learn something. But imagine my disappointment, therefore, on receiving yesterday's letter, and finding the lesson to be diametrically the opposite from what I had expected. It is impossible for me to express the sincere thanks which I feel for the great kindness which you have shown me. I shall endeavor to show my gratitude by recommending your Agency and paper to inventors. I shall ever feel that I have received a great favor at your hands, and that, too, when least expected. With deepest gratitude, I remain, yours,

LUTHER CHILD CROWELL.

West Dennis, Mass., May 20, 1862.

MESSRS. MUNN & Co.:—*Gentlemen*—I received this day the official announcement that my patent for an improvement in Lamp Burners is ordered to issue. Many, many thanks are due to you for the very skillful and thorough manner in which you have performed the complicated and intricate duties of your profession, and the railroad speed with which you transact your business with the Patent Office. I shall take great pleasure in recommending your Office to all persons who have business with the Patent Office. You also obtained a patent for me in 1859, after it had been twice rejected, and I consider it as valid a claim as could be asked for. These circumstances are sufficient to make me feel grateful toward you, and to incline me to recommend both your Agency and your invaluable paper. Yours, truly, SAMUEL MARSHALL.

Wilmington, Del., Fifth month 27, 1862.

MESSRS. MUNN & Co.:—Your letter announcing that my application for a patent has been allowed, is at hand. I am very thankful to you for the very able manner in which you have managed my application at the Patent Office and for bringing it to a successful issue. When I began making my model it was my intention to employ an Agency in Boston, but on reading in the SCIENTIFIC AMERICAN what you did for inventors I made up my mind that the best thing I could do was to employ you; and I am so well pleased, that if ever I have any more business at the Patent Office, it will be intrusted to your Agency.

Yours, &c., R. T. HATHAWAY.

New Bedford, Mass., June 2, 1862.

Tests of Galvanized Wire Rope.

Several experiments with wire rope were lately made at Liverpool, England, for the purpose of practically ascertaining the value of wire for standing rigging. The first was a piece of 2-inch galvanized charcoal wire, the Admiralty test for which is 4 tuns 6 cwt.; it broke at 5 tuns 15 cwt. This piece was taken from the topgallant backstays of the ship *Bogota*, and was supplied to this ship four and half years ago. It is still in good condition, there being no signs of rust in it, and it stood upward of 30 per cent above the admiralty test. The next test was a piece of $1\frac{1}{2}$-inch galvanized wire rope, which broke at 2 tuns 12 cwt. 2 qrs., the Admiralty test being 2 tuns 5 cwt. One piece $3\frac{3}{4}$-inch wire rope, six-strands, stood 17 tuns 15 cwt.; one piece $3\frac{3}{4}$-inch galvanized wire rope, four-strand formed rope, made of fine wire, stood the strain of 12 tuns 5 cwt. It was found that the rope composed of the greatest number of strands or wires stretched the least. Galvanized wire rope, for rigging, is now coming into common use.

Improvement in Iron-Built and Iron-Clad Vessels.

Wm. Ballard, of New York city, has recently made an improvement in iron-built and iron-clad vessels, which is considered to have some valuable features, and for which a patent has been ordered to issue. Part of the invention is applicable advantageously to mercantile as well as naval vessels. The issue of the patent is temporarily suspended, for the purpose of secresy, but when the patent issues we will publish a description of it.

TO OBTAIN THE GENUINE FLAVOR OF COFFEE.—The aroma which resides in the essential oil of the coffee-berry is gradually dissipated after roasting, and of course, still more so after being ground. In order to enjoy the full flavor in perfection, the berry should pass at once from the roasting pan to the mill, and thence to the coffee pot; and again, after being made should be mixed, when almost at boiling heat, with the hot milk. It must be very bad coffee, indeed, which these precautions being followed, will not afford an agreeable and exhilarating drink.

WASHINGTON SAFE.—We think we can assure the Hon. Secretary of War that Washington is safe from any attack of the rebels. The only danger is that Congress, if it continues in session much longer, may possibly explode. If the President could quietly shut up that great public gas manufactory, we think the political atmosphere would be less noisome.

MARSH GAS.—M. Boussingault, as stated in *Comptes Rendus*, has discovered that under the influence of direct sunlight the leaves of aquatic plants give off a notable proportion of carbonic oxide and carbureted hydrogen. He thinks that this emanation of carbonic oxide may be one of the causes of the unhealthiness of marshy districts.

INSTEAD of the use of the lancet for the suppression of boils at an early stage, Dr. Spooner, of Boston, recommends an ethereal solution of iodine (30 grains of iodine to one ounce of ether), applied with a brush morning and evening. The same application gives relief in chilblains and in erysipelas, or it may be varied by a solution of nitrate of silver.

A GERMAN woman at Winsted, Connecticut, thinks "we in this country don't know anything about war yet." During the existence of a war in Germany, she was compelled to work in a blacksmith's shop for three years, so scarce were men.

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Punch's Chronology of Future Inventions in Fire-arms

1860.—Mr. Armstrong, of Newcastle upon-Tyne, invents rifled ordnance, that will knock any ship to pieces. He is knighted, and the Admiralty is *benighted.*

1861.—The Admiralty recovers, and invents iron ships that resist any known cannon balls.

1862.—Sir William Armstrong invents a gun that smashes the iron ships into *blacksmithereens.* The Admiralty collapses.

1863.—The Admiralty re-expands and invents platina ships, fastened with diamond cement, and Sir William Armstrong's balls fly to pieces like bon-bons. Mr. Gladstone doubles the income tax.

1864.—Sir William Armstrong invents brazen thunderbolts (supposed to be the original Jupiter's), and in a pleasing experiment sends the greater part of the British fleet to the bottom of the sea.

1865.—The Admiralty invents torpedo vessels which sail under water, and below any range of guns. Sir William Armstrong tears his hair and swears in the Newcastle dialect.

1866.—Sir William Armstrong invents a vertical gun that discharges Greek fire straight down, and a second time he destroys the greater part of the British fleet. The lords of the Admiralty are about to hang themselves, when a thought strikes them and they don't. Mr. Gladstone again doubles the income tax.

1867.—Dr. Cumming, who has for some weeks been having his coals by the sack only, suddenly proclaims the Millennium. As there is now to be peace everywhere, the Admiralty does not invent anything, but waits to see. In order to test Dr. Cumming's veracity, and to find out whether lions will lie down with kids, the zoological society (against the advice of their excellent Secretary, Mr. Selater), let loose their biggest lion while a charity school is in the gardens. As the lion, instead of lying down with a kid, only lies down to digest him, the Admiralty thinks there is a mistake somewhere, and determines to invent a new fleet. Mr. Gladstone once more doubles the income tax.

1868.—The Admiralty invents a stone fleet, with cork keels, and defies Sir William Armstrong.

1869.—Sir William Armstrong invents the Hannibal shell, which contains the strongest vinegar, and melts the stone ships. Having for the third time destroyed the British fleet, he is raised to the peerage as Lord Bomb.

1870.—The Admiralty invents an aerial fleet, which sails in the clouds, out of shot range, and the first Lord takes a double sight at Sir William Armstrong. Mr. Gladstone a fourth time doubles the income tax.

1871.—Lord Bomb invents a balloon battering-train, and in an experimental discharge brings down all the British fleet into the German Ocean.

1872.—The Admiralty, in desperation, invents a subterranean fleet, which is to be conveyed by tunnels to all the colonies, but Mr. Gladstone blandly suggests that, as everybody now pays twice his income in taxes, the people may object to further imposts, unless some proof of economy is given. Government, therefore, stops the pensions of 100 superannuated clerks, discharges some extra night porters at the Treasury, and brings in estimates for the subterranean fleet.

1873.—Lord Bomb invents his typhæons, or earthquake shells, and suffocates the British fleet in the Tasmania Tunnel. Mr. Gladstone a fifth time doubles the income tax.

1874.—The Emperor of the French proclaims the Millennium, which of course, immediately occurs; no more war-ships are wanted, and the collectors remit the quarter's income tax not yet due. Lord Bomb invents his volcanic fireworks in honor of the occasion, and by some accident burns up the public.

An Invention of the Queen of France.

[From the London Herald.]

The French Empress despises everything common, and the hooped skirt having become so generally used, she instructed her tirewoman to get up something that every woman could not afford. The following is a description of the result of her endeavors:

This wonderful petticoat is in most instances to be made of cambric muslin, so that washerwomen cannot stiffen it too much. Its circumference is six yards at the widest point, and it is covered by nine flounces of still greater circumference. The lowest of these flounces is a mere frill; the second, a few inches longer and considerably wider, completely covers the first; the third does the same to the second, and so on till one great flounce falls completely over the other eight, each one of which, to arrive at the standard of Imperial elegance, must be hemstitched like a lady's pocket handkerchief, and the outer one in addition be nearly covered with the embroidery done by women of the Vosges. This invention also sets its face against the sewing machine, as nearly every part of it must be handwork. It was purposely so designed to prevent an immense number of seamstresses being suddenly thrown out of employment by the increased demand for machine sewing, which is not yet capable of effecting hemstitching or embroidery.

How to Make a Domestic Fish Pond.

A correspondent of the *Homestead* (Hartford, Conn.,) gives the following account of making a fishpond:—

Three years ago I constructed in a ravine a fish-pond, covering a surface of about three-fourths of an acre. It is fed by four small springs, and receives a large amount of surface water from the slopes around. It is fifteen feet deep at the greatest depth, and has shallow bays and inlets, where the small fish may breed and find protection from larger ones. It contains a small island and the shores are embellished with flags (*Iris*), water lilies (*Nymphæ odorata*) and other water plants. It was stocked with yellow bass, Oswego bass, white perch, and every variety of sun fish and minnows, also a dozen gold fish (*Cyprinus auratus*). And now, at the end of three years, it is astonishing to note the vast increase in my scaly family. They have multiplied by hundreds, and grown in size beyond all my calculations. The gold fish number several hundred, some of them over a foot in length, and a few of them are beautifully marked with silvery sides, and red fins, head and tail; others with golden sides and black fins and tail. I had no idea that they would thus sport in colors, but certainly they are very beautiful. The other fish have grown so much, that I intend to commence using them for the table in autumn. I have not fed these fish, except for amusement and to tame them, when a few crumbs of bread are thrown in, from a small bridge connecting the island with the shore, and the fish called up like chickens. The sun fish, gold fish, and smaller fry soon learned to come at my call, and to follow me in great numbers, from one end of the bridge to the other, for their morning or evening meal.

The young bass (the old ones hold back) and the sun-fish dart to the surface for their food, and have a lively scramble for it; the gold-fish pick up what sinks to the bottom. Their habits in this way are very much like a flock of chickens, for some of the smaller fish take their position immediately under my feet, to pick up the small crumbs that fall in breaking the larger ones to throw out. Some persons ring a small bell to bring their fish up, but I prefer calling mine. They do not appear to come from a greater distance than about forty feet to any one spot. I feed them in several places, to note the varieties and their growth. Now, as to the utility of this pond; it furnishes ice for my own use, and three or four of my neighbors who have ice-houses; it also affords an excellent stock of water, and will doubtless hereafter supply my table with fish. A small skiff on its surface gives many a pleasant hour of recreation to the young who are fond of rowing.

The construction of this pond was very simple. The earth was excavated across the ravine four feet deep and five feet wide for a foundation; then stiff clay filled in and well pounded, to prevent leakages at the bottom. The earth from the bottom and sides of the ravine was thrown on the top of this foundation, to raise the embankment to the proper hight. A waste weir at one side, paved with flag-stones, and two feet lower than the top of the dam, sufficiently large to carry off the heaviest flow of water in very heavy rains, guarded by a wire screen to prevent the escape of the fish, completed the construction. It is now sodded over, and planted with willows at the foot, and is considered safe. The expense of making such a pond is small, and it adds much to the value of the farm.

SINCE Greenwood was first laid out as a burying place in 1840, 89,867 have been interred within its limits. Think of it; what a large and silent city.

Nails in Fruit Trees.

A singular fact, and one worthy to be recorded, is mentioned by Mr. Alexander Duke, of Albemarle. He states that while on a visit to a neighbor, his attention was called to a large peach orchard, every tree of which was totally destroyed by the ravages of the worm, with the exception of three, and these were the most thrifty and flourishing peach trees he ever saw. The only cause of their superiority known to him, was an experiment made in consequence of observing that those parts of worm-eaten timber into which nails had been driven were generally sound. When his trees were about a year old, he drove a ten-penny nail through the body, as near the ground as possible; while the balance of his orchard had gradually failed, and finally yielded entirely to the ravages of the worms, these three trees, selected at random, treated precisely in the same manner with the exception of the nailing, had always been healthy, furnishing him at the very period with the greatest profusion of the most luscious fruit. It is supposed that the salt of iron afforded by the nails is offensive to the worm, while it is harmless, perhaps beneficial, to the tree.

A chemical writer on the subject says: "The oxydation or rusting of the iron by the sap, evolves ammonia, which, as the sap, rises, will of course impregnate every particle of foliage, and prove too severe a dose for the delicate palate of intruding insects." The writer recommends driving half a dozen nails into the trunk. Several experiments of the kind have resulted successfully.

Manufacture of Carpets.

Within a comparatively few years past, several improved kinds of carpet fabrics have been manufactured and come into extensive use. Among these is the well-known tapestry, which has been brought to great perfection. The peculiarity of this fabric is the unlimited number of shades or colors that can be introduced, so that the most elaborately colored designs, with flowers and scrolls, can be executed. The saving of worsted is also very important in an economical point of view. The appearance is the same or similar to Brussels carpet, but the manufacture is more simple, each thread being colored separately at spaces, with the various shades as they follow each other in the design. The process by which this is accomplished is beautifully simple and ingenious, but requires much care in placing and arranging the threads, and putting them on the beam, or the work will be imperfect. The patent Axminster is another kind—the design of this manufacture being to give the beautiful appearance of Axminster or Tournay, at less cost; it has been very successfully and extensively applied to the manufacture of rugs, as well as carpets. Another description of carpets, having the same appearance of Brussels, or tapestry, is also now much in use; this kind is woven plain by steam power, and is afterward printed by the same agency.

Plant an Apple Orchard.

When apples are $3 a barrel and upward, there is not adequate supply in the country. They can be grown at a dollar a barrel, with profit. The apple crop in a single small county in the State of New York, was worth half a million of dollars last year. Other counties in the Eastern States were under the necessity of paying out $100,000 for this fruit, because they had not the article at home. Peaches and plums we may be able to get along without, but apples we must have—for the dessert, and for the dinner basket of little boys and girls who can not come home from school to dine, and for many other uses. We say, then, to every farmer, plant an orchard of at least a hundred trees. The trees are all ready for you in the nursery, well grown and grafted, two or three years from the bud. Get thrifty trees, of varieties that you know will flourish in *your* locality, and in four years you will be eating fruit from them. Do not fail to plant an apple orchard this very month.—*American Agriculturist.*

HOUSES IN THE UNITED STATES.—There is one house to every six persons in the country. In New York city there are thirteen persons to a dwelling on the average; in Boston about nine; in New Orleans nearly seven.

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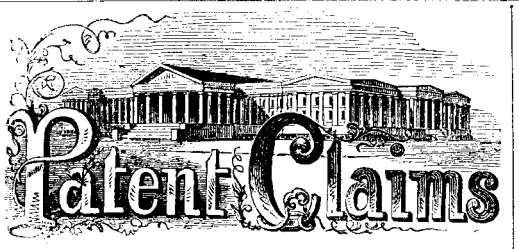

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING MAY 27, 1862.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

35,357.—Samuel Barlow, of Stakehill, Middleton, England, for Improvement in Apparatus for Bleaching and Cleaning Textile Fabrics. Patented in England July 23, 1853 :

I claim the combination of closed kiers, so arranged that, by direct pressure of steam within said kiers, bleaching or cleansing liquid can be forced interchangeably from one to the other, and through the textile material contained in one or both kiers, substantially as described, by which the goods or materials are subjected to the action of bleaching liquid and of steam, alternately, for the purpose specified.

And also the combination of a perforated pipe or pipes, or distributor or distributors, with a plate perforated at its outer edge, when arranged within a kier so as to admit cleansing liquid through the said perforated pipe or pipes within the bulk of the pack of goods and to discharge said liquid from said goods through said plate.

35,358.—Peter Bauer, of Newark, N. J., for Improvement in Skates :

I claim the clasp, **E**, consisting of a dovetailed guide, i, with two lugs, j k, in combination with the slide, g, and screw, f, as and for the purpose specified.

[This invention consists in the arrangement of two lugs or supports attached to one end of the toe strap in combination with a sliding clasp attached to one end and catching over suitable pins or projections secured to the other end of the the strap, and with a screw serving to impart motion to said sliding clasp and to tighten the strap in such a manner that by said lugs both ends of the screw are firmly supported, and a bending of the same is prevented.]

35,359.—Andrew Black, of New York City, for Improved Machine for Making Mold Candles :

I claim, first, The combination of a horizontally rotating mold table and a series of wick spools, **E E**, arranged in a stationary rack or stand, **D**, substantially as specified.

Second, The combination with the horizontally rotating mold table and the series of wick spools, **E E**, of a perforated wick board, H, and a system of wick clamps, G G, substantially as specified.

Third, The employment for molding candles of divided molds, constructed to operate substantially as described.

Fourth, The arrangement of the molds to slide, substantially as described, on horizontal racks, C C, curved by a horizontally rotating table.

35,360.—Gilbert Brooks and William Ogden, of Waverly, N. Y., assignors to themselves, William Brooks, of Waverly, N. Y., and C. C. Brooks, of Athens, N. Y., for Improvement in Grain Sieves :

We claim a compound sieve, composed of a succession of sieve plates, **B C D**, one over another and each having imperforated, perforated and imperforated elevations alternately, and the imperforated and perforated divisions of the several sieve plates following in succession below one another, substantially as and for the purpose specified.

35,361.—Gardner Chilson, of Boston, Mass, for Improvement in Boilers :

I claim the combination and arrangement of the gridiron, A, the cover or case, D, the intercepting plate, B, and the escape passage, C.

I also claim the arrangement and combination of the guard, B, with the gridiron, A, and its case, D, provided with an opening, C, and the intercepting plate, **B**, as described.

35,362.—Charles Chinnock, of Brooklyn, N. Y., for Improved Corkscrew :

I claim the combination of the frame, a, with the screw, b, and shoulder, c, substantially as and for the purpose specified.

35,363.—C. T. Close, of New York City, for Improvement in the Manufacture of Lamps :

I claim the combination of the globe or vessel, **l**, and base **2 2 2**, constructed and arranged substantially as set forth.

35,364.—Edward Cox, of Covington, Ky., for Improved Defensive Armor Plates :

I claim having the plates constructed with grooves and tongues, a b, fitting together in the peculiar manner shown and described, so that the plates will be locked together both horizontally and vertically, all as set forth.

35,365.—W. V. Daboll, of Cranston, R. I., for Improvement in Street Sweeping Machines :

I claim, first, The combination of the shaft, k, the hubs, h h, the radial arms, f f f, the springs, s s s, the collars, n n, with the brushes, I I I, substantially as described, for the purpose specified.

Second, I claim in combination with the brush cylinder, as arranged, the levers, **B** and **T**, with suitable connections, in combination with the hook, V, or an equivalent fastening, operating substantially as described for the purpose specified.

35,366.—Perry Dickson, of Utica, Minn., for Improved Water Wheels :

I claim a water wheel fitted loosely on its shaft, A, and connected therewith by springs and provided with adjustable buckets, c, connected with the shaft by levers, B′, and collar, C, or equivalent mechanism, all arranged to operate as and for the purpose set forth.

[This invention relates to an improvement which is applicable to either center vent or outward discharge horizontal water wheels, and consists in providing the wheel with supplemental adjustable buckets, arranged with permanent stationary buckets, and connected with the shaft in such a manner that they will be self-adjusting and made to open and close so that the issues or discharged orifices of the wheel will always be proportionate in area to the power required of the wheel, thereby avoiding a useless expenditure of water when the wheel is running and driving machinery less than its maximum power.]

35,367.—Henry Dunphy, of New York City, for Improvement in Cloth-plaiting Machine :

I claim, first, Combining with movable holders, B B, a series of blades or folders, a a a, separated from each other the desired distance by the piece, b b b, for folding cloth into plaits, substantially as set forth and specified.

Second, I claim in combination with the folders, a, separators, b, and movable holder, **B**, the ironing bar, **D**, for flattening and smoothing the folds after they are passed through the folders, substantially as described and specified.

Third, I claim the holders, **B B**, for locking up the folders, a, and separators, b, constructed and operating substantially as set forth and specified.

35,368.—Samuel Ehrman, of Mount Joy, Pa., for Improvement in Shutter Fastenings :

I claim the combination of the casing, **B B′**, with its pivot box, C, groove, F, and slot, **E**, and hinged pawl, **A**, together with the guard plate, D, when these several parts are combined and arranged substantially in the manner and for the purpose specified.

35,369.—A. H. French, of Pittsfield, Ill., for Improvement in Water Elevators :

I claim the flat or square-linked chain, E, the grooved pulley, C, carrying stop pins, b b, buckets, D D′, with hinged valves in their bottoms, and hooks, h h, on their sides, and the hinged troughs, G G′, with their pivoted bails, g g′, all arranged and combined as and for the purpose set forth.

35,370.—William Fulton, of Cranberry, N. J., for Improvement in Coal-oil Burners :

I claim, first, The combination of gauze wire, m, as shown in Fig. 7, with holes, K, as shown in Fig. 1 and Fig. 5, or their equivalents.

Second, I claim the combination of holes, K, as shown in Fig. 1 and Fig. 5, with the gauze-wire or perforated plate, L, as shown in Fig. 3 or their equivalents.

Third, I claim the combination of the impinger, D, with holes, K, shown in Fig. 1 and Fig. 5, and the gauze wire or perforated plate, L, as shown in Fig. 3, the whole being arranged substantially as and for the purpose set forth.

35,371.—C. P. Goss, of St. Johnsbury, Vt., for Improved Cultivator and Potato Digger :

I claim the combination and arrangement of the single scoop and the rotary breaker, the driving wheels, their shaft, and machinery for rotating the breaker, the whole being substantially as specified.

I also claim the combination and arrangement of the scoop and rotary breaker, with a separate frame, A, and two bars, N N, extending from the axle of the driving wheels, and arranged with respect to one another, and provided with elevating and depressing mechanism, as specified.

I also claim the combination of mechanism for simultaneously elevating and depressing the scoop and the breaker, and adjusting the point of the breaker relatively to the ground, the same consisting of the cranked lever, S, the hand lever, T, the crooked connection bar, U, the arm, V, and its slotted bar, W, and set screw, m, the whole being applied to the main frame, A, and the auxiliary bars, N N, of the machine, and to the scoop shaft, substantially as and so as to operate as described.

I claim not only the application of the knife or cutter to the scoop in such manner that the angle of declination of the said knife may be varied relatively to the scoop, but the application of a supporting chain or its equivalent to the knife and the main frame of the machine and to support the upper end of the knife, as set forth.

35,372.—Ralph Grow, of Galesburg, Ill., for Improved Benzole Soap :

I claim the employment of benzole when used in the manufacture of soap, substantially as specified.

35,373.—C. O. Guernsey, of Cornwall, Vt., for Improvement in Watch Escapements :

I claim the combination with a cylinder watch of the mechanism described for operating two balance wheels which shall oscillate alike, but in opposite directions.

35,374.—George Heath, of Little Falls, N. Y., for Improvement in Wrought-iron Bridges :

I claim, first, The combination of the diagonal double or forked braces, B, straining beams, A, vertical rods, E, and chords, C, substantially as and for the purpose set forth.

Second, Constructing the straining beams, A, and braces, B, of wrought metal plates and angle irons connected together by rivets, substantially as and for the purpose specified.

Third, Securing the lower ends of the braces, B, and vertical rods, E, to the chords, C, by means of the thimbles, j, and lock nuts, D, but this I only claim when used with the peculiar arrangement of the rods, E, braces, B, and straining beams, A, as described.

Fourth, The needle beams, F, constructed as shown, when used in combination with the chords, C, and applied thereto, as set forth.

[An engraving of this bridge will soon appear in the SCIENTIFIC AMERICAN.]

35,375.—H. A. Houghton, of Lyme, N. H., for Improved Clothes Dryer :

I claim the prismatic hub, as made, with its arm sockets on the same, and brace buttresses, constructed and arranged substantially as specified.

And in combination with the hub so made and with the arms applied to it as described, I claim the series of braces applied to the arms respectively and substantially in manner and so as to operate as described.

35,376.—Caspar Jagy, of New York City, for Improvement in Locks :

I claim, first, Connecting the plate, C, to which side bolts may be attached, to the main bolt, between the spindle and the wards, as and for the purpose specified.

Second, Adjusting the wards by means of the spindle through the instrumentality of the lever, **E**, the slide, F, and the key, substantially as set forth.

Third, The combination of the key with the wards and plate, F, when arranged and constructed in the manner and for the purpose set forth.

35,377.—Frederic Kettler, of Milwaukie, Wis., for Improved Heel for Boots and Shoes :

I claim a heel composed of an iron casing constructed with the teeth, as described, in combination with a filling in whole or only in the tread, with gutta percha.

Also the combination of the casing, constructed as described, with a covering up to the line of the teeth, of gutta percha and a filling of the same or other material, in the manner described, and the angle, B, in combination with the casing constructed as described.

35,378.—P. L. Kreuter, of Bloomington, Ill., for Improved Piston Packing :

I claim, first, The arrangement of the spring valves, g g′, and guides, e, in combination with the apertures, f f′, in the piston head and follower, as and for the purpose shown and described.

Second, The arrangement of the protecting plate, j, in combination with the packing rings, F and **E**, as and for the purpose set forth.

Third, The toothed rack, h, and tooth, i, on the ends of the packing ring, F, as and for the purpose specified.

35,379.—G. B. Mallette, of Millport, N. Y., for Improved Washing Machine :

I claim the combination of the exhaust or suction pump, B, with a suitable box or vat, A, and loose rack, **E**, or its equivalent, for washing the clothes without pressure, arranged and operating substantially as set forth.

I also claim the combination of the exhaust pump, B, with the presure rack, **J**, or its equivalent, operating in the box, A, for drying the clothes under pressure, the same device answering for both purposes when the press, J, is applied, and the pump made to discharge its water outside of the box, substantially as shown and described.

35,380.—Edward R. McCabe, of Rochester, Iowa, for Improvement in Breech-loading Ordnance :

I claim, first, Fitting the chamber of a breech-loading gun with a removable tube, B, of the character described and termed an internal reinforce, for the purpose specified.

Second, The breech composed of two plates or blocks, C D, combined with each other and with the gun by means of the dovetail cheek piece, **F F**, and screw, G, applied and operating substantially as and for the purpose specified.

Third, The priming tube, H, and plunger, **I**, applied in combination with each other and with the breech, substantially as specified.

35,381.—A. McGuffie, of Rochester, N. Y., for Improvement in Truss Bridges :

I claim the truss composed of the arch sections, B, with their shoes, I I, to rest on the abutments or piers, the chords, A A and F F, posts, C C, and angle braces, D D, the whole arranged and combined substantially as and for the purpose specified.

[This invention consists in a novel arrangement and combination of wooden arch segments, posts and chords, and wrought-iron angle braces, forming a very simple, strong and stiff truss.]

35,382.—R. M. Merrill, of Chicago, Ill., for Improved Lantern Lamp :

I claim the application of one or more air passages through a lantern lamp and its bottom, substantially as described and for the purpose specified.

Also the application of one or more air passages through a lantern lamp and its bottom, substantially as described and for the purpose specified, in combination with an air current checker, for the purpose set forth.

35,383.—O. F. Morrill, of Chelsea, Mass., for Improvement in Apparatus for Vaporizing and Burning Liquid Hydrocarbons :

I claim an aero-vapor burner as constructed, with the fluid vaporizing conduit arranged to extend across or over the same and through the chimney, and from thence to pass down alongside of and enter the air and vapor-mixing chamber, substantially as described.

I also claim the combination of the reservoir and its conduit, provided with a regulating or stopcock, as described, with the aero-vapor burning in such manner that the fluid to be vaporized shall be caused by the action of gravity to pass through the stopcock and the vaporizing tube and across or over the foraminous cap of the burner, in order that the fluid may be heated or vaporized by the flame of the mixed air and vapor applied directly to the conduit as set forth.

35,384.—J. A. Mowris, of Neversink, N. Y., for Improvement in Wagons :

I claim this substitute for the common elliptic spring buggy, a body the outline of whose ball is the arc of a circle confined upon horizontal longitudinal spring bars, as set forth.

35,385.—L. N. Muir and A. J. Kline, of Jersey Shore, Pa., for Improved Washing Machine :

We claim the arrangement and combination of the double-cranked shaft, D, double-slotted arms, C, double-sliding bars, F, double-slotted uprights, E, head or cross piece, H, and spring lever, G, the whole constructed and operated in the manner described and set forth.

35,386.—Hiram Nash, of Lockport, N. Y., for Improvement in Water Elevators :

I claim, first, The windlass, having an enlarged central portion, H, or its equivalent, with smaller portions, K K, on each side thereof for the ends of the cord or chain to wind on, when the same is used in connection with a cord or chain, **L**, extending through and adjustable in said central portion, and a crossbar, M, to which the ends of the cord or chain are attached, the whole arranged, combined and operating substantially as described.

Second, In combination with the enlarged central portion, H, of the windlass, or its equivalent, I also claim the cross bar, M, and bucket, N, whereby the latter is thrown outward when raised to discharge its water, substantially as set forth.

Third, In combination with the enlarged portion, H, of the windlass, or its equivalent, I also claim the crossbar, M, provided with an arm, Q, the connecting rod, R, and valve, P, whereby the said valve is opened at the proper time to discharge the water from the bucket, substantially as specified.

Fourth, I also claim providing the upper end of the connecting rod, B, connecting the valve, P, with the arm, Q, in an elongated loop, k, passing over a bearing, h, in the end of the arm, whereby not only is the valve raised at the proper time in discharging the water, but also when the bucket is lowered in the well, the valve is allowed to open freely to admit the ingress of the water, the whole arranged and operating substantially in the manner and for the purpose specified.

35,387.—Samuel Nowlan, of New York City, for Improvement in Rice Cleaning Hulling and Pearling Machine :

I claim, first, The combination with stationary and elastic wire beds of the reciprocating cast-iron plates or stone slabs, substantially in the manner and for the purpose described.

Second, The combination with a stationary conical screen, constructed as described, of a revolving shaft and inclined dashers or blades, the whole operating together substantially as set forth.

35,388.—F. B. Pierce, of Brockport, Ill., for Improvement in Rotary Pumps :

I claim, first, The construction of the piston packing pieces, J and K K, with oblique surfaces, i i and hh, fitting together substantially as described, whereby the piece, J, in being set out is caused to act like a wedge upon K K and set them out also, as set forth.

Second, In combination with the foregoing the tenons, e e, constructed and arranged substantially as and for the purpose specified.

Third, The setting out of the pieces, J, by means of set screws, j j, applied and operating in the manner specified.

Fourth, The combination of the abutment and piston slot packing pieces, H and N, or either of them, with the wedge pieces, R P, and screws, u p, applied and operating substantially as and for the purpose specified.

Fifth, The packing pieces, H and **N**, with flanges, s t r, substantially as and for the purpose set forth.

[This invention consists in certain improvements in the combination and modes of fitting and adjusting the packing of the pistons and abutments, whereby leakage is more effectually prevented and greater convenience is afforded for adjustment.]

35,389.—G. P. Reed, of Roxbury, Mass., for Improvement in Watch Escapements :

I claim the arrangement and combination of the segmental detent, f, and a detaining and impulse pallet, e, with the vibratory lever, **B**, and a scape wheel, A, constructed as described, the whole being applied to the balance by means and so as to operate therewith and together, substantially as explained.

35,390.—John Richards, of Columbus, Ohio, for Improvement in Guide and Support for Scroll Saws :

I claim the guide bars, a a, and the back plate, b, in connection with the sliding guard strip, A, the same constituting a combined guide, guard and support, for the top of a scroll saw and operating substantially as described.

35,391.—John Richards, of Columbus, Ohio, for Improved Scroll Saw Stocks :

I claim, first, A guiding stock and pitman, combined and operating substantially in the manner and for the purpose described.

Second, The combination of a split pin and set screw, or its equivalent, with a scroll saw blade and the upper end of a pitman, substantially as and for the purpose described.

Third, The combination of the socketed head piece, pitman, screw bolt and nut, substantially as and for the purposes described.

35,392.—John Richards, of Columbus, Ohio, for Improvement in Scroll Saw Mills :

I claim, first, The tubular saw stock, **E**, and flexible pitman, **D**, in combination with the guard, support and guide, J n o p, substantially as and for the purpose described.

Second, The tubular saw stock, E, and flexible pitman, D, in combination with the guard, support and guide, J n o p, arranged with a single solid structure, A, and operating in the manner and for the purpose set forth.

35,393.—M. T. Ridout, of Milwaukie, Wis., for Improvement in Butter Molds :

I claim the use of a piston and piston rod in connection with the cavity of a butter mold of any desired size or shape, when the said piston is arrested in its movement at determined intervals, substantially in the manner and for the purpose set forth.

When a piston and piston rod are combined with a butter mold, as set forth, I also claim the combination therewith of one or more knife blades moving horizontally over the bottom of the cavity in said mold, substantially in the manner and for the purpose set forth.

35,394.—Elisha Robbins, of Milford, Mass., for Improvement in Looms :

I claim the application and arrangement of the spring stop jaw, **c**, with the binder, and so as to extend into the shuttle box, and operate with the picker or its staff, substantially as specified.

I also claim the combination and arrangement of the auxiliary spring jaw, d, with the spring jaw, c, when arranged with and extended from the binder, as specified.

I also claim the combination and arrangement of the adjustable guides, e e, with the shuttle box, the picker and its staff, as explained, when the said picker is made substantially as described.

I also claim the combination and arrangement of the forked radius arm, F, the socket piece, G, and the spring, H, as applied to the picker staff and lay, and so as to operate therewith, substantially as specified.

35,395.—Elisha Robbins, of Hopedale, Mass., for Improvement in the Picker Staff for Looms :

I claim the arrangement of the cammed bearers, a a, their shoulders or caps, b b, and the picker staff with the foot, **D**, and supporting arm, C, as described.

35,396.—H. A. Roe, of Madison, Ohio, for Improvement in Valves to Heaters for Cheese Vats :

First, I claim constructing and operating valves in the heaters to cheese vats with the valve lever below the valve bar, and within the heater, one end of said lever being connected to the valve bar, and the other with a rod working through an open tube, substantially as and for the purpose specified.

I claim, second, Operating the valves in heaters to cheese vats with

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a valve rod working through an open tube on the heater, as and for the purpose specified.

I claim, third, making the tube, for the escape of steam, separate from and fastening it to the heater with a yoke and bolt, for the purpose specified.

35,397.—M. and S. Shawver, of Bellefontaine, Ohio, for Improvement in Harvesters:

We claim, first, The drum, L, provided with a spiral spring, L′, and connected to the bar, H, which is provided with a spring stop, u, and rack, I, in connection with the adjustable shaft, O, provided with the pinion, N, and operated as shown, and the treadles, R S, arranged for actuating respectively the shaft, O, and spring stop, u, substantially as and for the purpose set forth.

Second, The manner of securing the bar, E, to the main frame, A, as shown and described, to wit, by means of the pivot, d, slotted plate, F, and set screw, e, whereby the platform and consequently the sickle may be readily adjusted higher or lower, as described.

[This invention relates to an improved device for harvesters of that class which are provided with adjustable rake teeth and which work in slots in the platform of the harvester. The object of the invention is to obtain a raking device which may be operated at the will of the driver and also be capable of being adjusted, so that the sickle which is attached as usual to the platform may be made to cut higher or lower, as described.]

35,398.—D. H. Shearer, of West Grove, and Cyrus Haynes, of Centerville, Iowa, for Improved Washing Machine:

We claim the combination and arrangement of the inclined slats, a a, on the concave washboards, G G, and rubber, C, with intervening apertures, rollers, H H, and dirt chamber, K, substantially as and for the purpose specified.

35,399.—H. A. Smead and C. H. Huntly, of Pavilion, N.Y., for Improvement in Car Couplings:

We claim a removable bumper head or buffer, C, when made entire, and which is removed and replaced by sliding it on or off the end of the coupling bar in a horizontal direction, substantially as described.

Second, We claim the imperfect disk, G, which is made perfect by the insertion of a shackle bar formed with a solid double convex head, in combination with jaws having concave parts, h h′, forming circles concentric with that of the disk, G, as and for the purpose set forth.

Third, We claim the combination of the disk, G, and solid double convex-headed shackle bar, with the sliding spring block, F, as described.

Fourth, We claim the means described for coupling and uncoupling the shackle bar, consisting of the spring stop, R, and foot, S, projection, T, lever, N, pin, M, and curved sliding bar, L, as specified.

35,400.—C. G. Smith, of Mount Vernon, N. Y., for Improved Composition for Water-proofing Cloth, Leather, &c.:

I claim the described composition consisting of linseed oil, white wax, spermaceti, litharge and burgundy pitch, mixed together in the manner and about in the proportion specified.

[This composition, when applied to leather, cloth or other fabric, will make the same perfectly impervious to water.]

35,401.—L. A. Sprague, of Brooklyn, N. Y., for Improvement in Buckles:

I claim constructing the lever of a strip or plate of metal folded back upon itself or doubled and inclosing the axis of the frame upon which the lever turns or works, as set forth.

[This invention relates to an improvement in that class of buckles which hold the part of the strap which passes through them by pinching or griping it. The nature of the invention consists in making a buckle of the class specified in two parts, namely, a frame having an axis upon which the lever turns, and a lever so set upon the axis of the frame that while one end is permanently riveted or attached to the strap, the other end of the lever pinches and holds the free end of the strap against the frame.]

35,402.—G. W. Thompson, of New York City, for Improvement in Self-regulating Gas Burners:

I claim the air chamber, I, and entrance, 2, in combination with an elastic diaphragm operating a conical valve, the whole being constructed, and operating substantially as set forth, and for the purpose of regulating the flow of gas at the burner.

35,403.—Benjamin Tobias, of Washington, Ill., for Improvement in Ditching Machines:

I claim the combination of the deflecting plates, L, and bar, C, with the inclines, J, cutters, G H H, standard, D, and shoe, F, when the said parts are arranged and operate together as shown and described.

[This invention consists in the arrangement of a vertical knife, two inclined flaring side cutters and double-inclined planes and deflecting plates, in combination with a cutting shoe and sod cutter on a common beam, in such a manner that by the combined action of said parts a perfect ditch is produced with inclined sides and having the dirt piled up on both sides, and that no additional hand labor is required to render the same complete and durable.]

35,404.—A. C. Vaughan, of Bedford, Pa., for Improvement in Revolving Fire Arms:

I claim, first, A revolving breech, E, having two concentric circles of chambers provided respectively with axial nipples, F′, and oblique nipples, F2, for the objects stated.

Second, A double barrel and a revolving breech having two concentric series of chambers in combination with two hammers actuated in succession by a single trigger, and one of them employed to discharge an outer and the other an inner chamber, substantially as set forth.

[By this invention an arm is afforded, with very slight additional weight, which will fire twice as many successive shots as revolvers in common use.]

35,405.—S. M. Washburn, of Poughkeepsie, N. Y., for Improvement in Water Elevators:

I claim the combination and arrangement of the crank socket, C′ with the brake wheel, D, for the purpose substantially as specified.

35,406.—J. M. Whiting, of Providence, R. I., for Improvement in Machines for Threading Wood Screws:

I claim, first, The face plate, F, and the series of studs, h h i i, m combination with the dog, n, or its equivalent, upon the tool post, arranged and operating substantially as described for the purpose specified.

I claim, second, A series of studs which are alternately larger, h h, and smaller, i i, in diameter, in the order in which they are arranged, substantially as described for the purpose specified.

I claim, third, the combination and arrangement of the cams, t t, &c., the studs, h i, &c., and the springs, g and 9, for the purpose of effecting a connection and a disconnection at the proper time between the threading tool holder and the device which reciprocates the same, substantially as described.

Fourth, I claim the sliding carrier, N, arranged with the hopper, M, in combination with the hinged prongs, s s, upon the railway, and operating substantially as described for the purpose specified.

35,407.—J. F. Winslow, of Troy, N. Y., for Improved Armor Plates for Vessels:

I claim the combination of one or more series of armor plates with rebates, projections and corresponding indentations, constructed and applied substantially as described.

I also claim the recess, m, for the bolt heads, g, in combination with the flange, a, of the armor plate, A, riveted over and upon the plank, C, of the next adjoining armor plate, A, substantially as described.

35,408.—A. I. Ambler (assignor of himself, R. N. Ambler, and Warrick Martin), of Milwaukee, Wis., for Improvement in Railroad Car Brakes:

I claim, first, The burr or friction wheels, F G, arranged in relation with each other, and the driving wheel, C, of the locomotive as shown, and the shaft, E″ K, provided with universal joints, b e, and connected by the band, I, or gearing, in combination with the screw, L, on shaft, K, and the lever or treadle, N, connected with the shafts, K, and, O, all arranged to operate with the tumbling rod, S, substantially as, and for the purpose set forth.

Second, The indicator formed of the index, b′, traversing over a properly graduated dial plate, a′, and operated from the tumbling rod, S, as shown, or in any equivalent way, to indicate the position or state of the brakes as described.

Third, The combination and arrangement of the levers, C′ J′ O′, chains, H′ K′, and rods, I′ N′, as shown, for transmitting the power to the brake bars, L′ L′ P′ R′.

Fourth, The adjustable shaft, S′, provided with the screw, T′, arranged with the segment slide, U′, or its equivalent, and connected with the shaft, r′, of the hand wheel, Y, in combination with the worm wheel, q′, on the tumbling rod, V, and the shaft, D′, provided with the worm wheel, h′, and connected with the lever, C′, as shown, substantially as, and for the purpose set forth.

[The object of this invention is to obtain a car brake which may be placed under the complete control of the engineer, and be capable of being operated at will, at a maximum pressure or to any degree below the same to the minimum, and at the same time be capable of being operated from the cars by brakemen, like an ordinary car brake. All the brakes of a series of cars being operated simultaneously by the engineer, and all of them, or any one of them separately by the brakeman. The invention also has further for its object the indicating of the precise portion of the brakes at any point of their movement, to serve as a guide to the engineer and brakemen in adjusting and operating the same.]

35,409.—F. W. Armstrong, of New York City, assignor to himself, S. G. Milligan, and J. S. Green, Jr., of Elizabeth, N. J., for Improved Composition for Journal Boxes:

I claim the wool flock, concentrated solution of alum, gum, or mucilage, and plaster of Paris, or the equivalent substances named, when combined substantially in the proportion, and for the purpose specified.

[This invention has been practically tested, and has been found to answer an excellent purpose.]

35,410.—Alfred Bridges, of Newton, Mass., assignor to himself, and Albert Bridges, of New York City, for Improvement in Car Trucks:

I claim the application of springs, H, or their equivalents, on each side of the bolster beam, C, substantially in the manner, and for the purpose specified.

35,411.—C. S. Bulkley (assignor to himself, and J. E. Boyd), of New York City, for Improvement in Apparatus for Compressing Musket Balls:

I claim, first, The employment in a bullet compressing machine of the lever, B, and cam, a, with the toggles, M N, arranged relatively thereto, substantially as described and shown, for the purpose set forth.

Second, Releasing a single pellet at each descent of the compressing punch in a bullet-compressing machine by means of the check, J, or its equivalent, operating substantially in the manner set forth.

35,412.—M. L. Callender, of New York City, and N. W. Northrup, of Greene, N. Y., assignors to themselves, and C. H. Welling, of New York City, for Improved Defensive Armor for Ships:

First, What we claim is the use of long metallic plates of defensive armor ribbed, as described, in combination with the circular stringers, by which they are attached substantially as and for the purpose described.

Second, The manufacture and use of tubes placed between the surfaces of concave plates of stringers of iron, together with, and the mode of fastening them for mailing vessels, and other military purposes as described.

Third, The combination of the flange and rib plates, the concave plates and connecting tubes, with the intermediate plate and springs to make a shot or shell-proof mailing for war ships, and other military purposes substantially as described.

Fourth, The use of metallic tubes for mailing war vessels when constructed and applied, substantially as described.

35,413.—Wesley Sawyer, of Lowell, Mass., for Improvement in Fire Escapes:

I claim the combination and arrangement of one or more struts or tormentors, e, with a series of tubes, C C′ C″, supported by pivots, c, and made to extend in the manner of a telescope, and combined with the truck, A, swivel platform, H, and rising and falling baskets, I, constructed and operating substantially, as and for the purpose set forth.

I also claim the combination of the rising and falling baskets, I, chain, n, and revolving fan, J, constructed and operating in the manner and for the purpose described.

35,414.—John Carey, of Brooklyn, N. Y., assignor to S. A. Smith, of Smithtown, N. Y., for Improvement in Metallic Bedsteads:

I claim, as an improved article of manufacture, a metallic bedstead having its posts, A, formed of sheet metal bent in tubular form, and its end rails, B, formed of wrought iron angle plates, the two posts and end rail at each end of the bedstead being connected by castings, C, shrunk or cast on them as described, and the castings provided with dovetail grooves to receive the tenons of the cast metal side rails, D, which are formed of two parts connected by dovetail joints with castings, E, which are shrunk or cast on tubular sheet metal legs, F, substantially as set forth.

I further claim in combination with the parts constructed as above described, the longitudinal extension rods, G G, attached to the wrought metal end pieces, B B, and provided with screw joints, e, as and for the purpose specified.

[This invention consists in constructing the bedstead of wrought and cast metal, in such a manner that a strong and durable bedstead is obtained, one that may be cheaply manufactured and still have a chaste and ornamental appearance.]

35,415.—W. Coggeshall (assignor to himself, and W. T. Coggeshall), of Finley, Ohio, for Improvement in Plows:

I claim the combination of the adjustable rod, E, and adjustable beam, F, arranged and applied to the plow as and for the purpose set forth.

[This invention relates to an improvement in the draft beam of the plow, whereby it is believed that the draft is much decreased below that of ordinary plows in use, and the plow rendered capable of being readily adjusted to regulate the depth of the furrow as circumstances may require.]

35,416.—H. K. Gardner (assignor to himself, to A. J. Glossbrenner), of York, Pa., for Improvement in Pneumatic Telegraphs:

I claim the combination of a recording instrument operated by means of a current of compressed air, with a transmitting instrument which controls said current, for the purpose of transmitting intelligence, substantially in the manner described.

I also claim the combination of the pen, c, and plunger, E, substantially in the manner described for the purpose set forth.

I also claim, making an aperture, f, in the cylinder, F, for the purpose of securing celerity and certainty in the action of the plunger, F, substantially as described.

35,417.—Louis Harper, of Brooklyn, N. Y., assignor to W. T. Glidden, of Brookline, Mass., for Improvement in Fertilizers:

I claim the restoration of phosphated guano, in the manner and by the means substantially as described.

35,418.—John Haskins, of Roxbury, Mass., assignor to S. P. Blake, of Boston, Mass., for Improvement in Gun-Nipple Protector:

I claim a gun-nipple protector constructed of India Rubber, or any of its compounds substantially as described and for the objects specified.

35,419.—C. W. Hopkins (assignor to himself, T. K. Bacon, and A. E. Cobb), of Norwich, Conn., for Improvement in Revolving Fire Arms.

I claim the employment in combination with the axis pin, E, of the curved slot, c d, and swinging arm, F, substantially as and for the purpose shown and described.

35,420.—Edward Joslin, of Keene, N. H., and D. L. Gibbs, of Norwich, Conn., assignors to C. B. Rogers, &c., of Norwich, Conn., for Improvement in Hub Mortising Machines:

I claim, first, The thumb lever, A, when used in combination with the spring, c, to draw the index pin out of holes in dial ring.

Second, The sliding plate, H, on the tilting bar, L, when used to raise the spring, K, as specified.

Third, The swivel head, three movable stop plates, U U, set screws, I I, and adjustable collars, R R, when connected with bed, W, by connecting bar, P, for the purpose specified.

35,421.—George Leach, of Elmira, N. Y., assignor to himself, and Edmund Burke, of Newport, N. H., for Improvement in Grain Separators:

I claim, first, The arrangement of the screens and chutes in the vibrating box or case, B, in combination with the spout, H, passage, I′, and knockers, L, and, M, substantially as and for the purpose set forth.

Second, The adjustable bars, O, placed in the vibrating box or case, B, and arranged with the screens and chutes thereof, substantially as and for the purpose set forth.

Third, The cross blasts formed in the spouts, a′ b″, by means of the openings, e″ e′ e″, as described for the purpose set forth.

Fourth, The combination of the spouts, a a′ b′ b″, and, h, with the chamber, U, fan, P, adjustable gate, V, and self-acting valve, R, all arranged as shown, in connection with the box or case, B, containing the screens and chutes, as and for the purpose specified.

35,422.—William Lyman, Jr. (assignor to himself, and S. M. Wead), of Malone, N. Y., Improvement in Cultivators:

I claim the combination with the plow, A, and beam, D, of the long hoes, B B, with their adjusting arms, d d, and short hoes, C C, with their adjusting arms, f f, said parts being constructed and arranged to operate in relation to each other, substantially as shown and described.

35,423.—B. A. Mason (assignor to Sarah J. Mason), of Newport, R. I., for Improvement in Machines for Threading Wood Screws.

I claim, first, The feeding mechanism, consisting of the intermittently rotating grooved barrel and casing with its slotted ways, in combination with annular chucks and chuck carrier, substantially as described.

Second, The combination of the rotating chuck carrier, and a screw threading tool operating, substantially as described.

Third, I claim the annular chuck in two sections, one containing the radial jaws and forming the journal to work in fixed bearings, and the other which contains the cams, the part by which rotating motion is communicated to both parts of the chuck when combined and arranged, substantially as described.

Fourth, I claim the annular chuck when constructed and arranged, substantially as described, in combination with a screw-cutting tool, so that the gripe of the segment jaws of the chuck are tightened upon the shank of the screw, proportionally to the impinging force of the cutting tool, which by reason of its opposition to the rotating of the chuck and blank, causing the two parts of the chuck (one containing the segment jaws, and the other, the cams acting on them), to turn on each other for the purpose of tightening the gripe of the chuck upon the blank, substantially as described.

Fifth, I claim in combination with the cutting tool, the cam carrier, with its progressive series of graduated cams, when intermittently rotated by the backward motion of the arm of the tool carrier, so as to bring each cam successively to the proper place to guide the tool while performing the operation of threading the screw by successive light cuts, substantially as described.

Sixth, I claim the feeding mechanism, the annular chucks, and their carrier, in combination with the threading mechanism, the whole combined and arranged, substantially as described.

35,424.—Chester Merritt (assignor to himself, and D. D. Whitker), of Rutland, Vt., for Improvement in Weather Strips for Doors:

I claim a weather strip of india rubber, guarded upon one edge with a thin clasp of metal, which is inserted into a narrow crevice in the edge of the door or window, and having on each side of it a groove, capable of receiving it when turned down, the whole being constructed, substantially as described.

35,425.—J. P. Worthing (assignor to Nelson Orcutt, and G. W. Gregory), of Binghamton, N. Y., for Improved arrangement of Feathering Floats with Paddle Wheels:

I claim my specific method of connecting float to float, or bucket to bucket, when to the axles of each float I attach the crank, A, and the rod, B, and when the whole is combined, with the interlacing bars, C C.

35,426.—Joel Harris, of New Carlisle, Ind., for Improvement in Bee Hives:

I claim the combination of the chambers, L L′, with the comb frames, E E, and the single inclined plane bottoms, D D, with the slide, m, by means of which I can close or open the communication between the two chambers, L L′, at pleasure, the whole being constructed and arranged in the manner and for the purpose specified.

35,427.—Michael Mann, of Syracuse, N. Y., for Improved Artificial Fuel:

I claim the composition composed of the ingredients combined as described, and in about the proportions for the purpose set forth, the same constituting an improved, new and useful article of manufacture.

RE-ISSUES.

1,311.—J. R. Floyd, of New York City, for Improvement in Burglar Proof Safes:

My claim consists in the use or introduction of the crystallized or cast franklinite, or similarly constituted metal by whatever name known, in the construction of safes, or parts thereof, to render such structures proof against the use of all kinds of known cutting tools.

1,312.—J. C. Morris, of Cincinnati, Ohio, for Improvement in Wood Bending Machines:

I claim, first, A wood bending form, to which timbers are made to conform by bending them from the center or inner end of the desired curve outward, when used in combination with abutments or clamps to prevent or regulate end expansion, and levers, or handles, or their equivalents to guide the bending, substantially as described.

Second, A stationary or poised wood-bending form, in combination with the cords, levers and drum, or their equivalents, and the eccentric clamp or its equivalent, in the manner and for the purposes set forth.

Third, In combination with the stationary form, levers and abatments, I claim the employment of hooks, or hooks and pins, or their equivalents, that shall embrace the ends of the wood to restrain the wood in shape, and permit the removal of the abutments, after the completion of each operation.

DESIGNS.

1,595.—John Rogers, of New York City, for Design for Statuary: The Checker Players.

1,596.—John Rogers, of New York City, for Design for Statuary: The Village Schoolmaster.

1,597.—John Rogers, of New York City, for Design for Statuary: The Camp Fire.

1,598.—John Rogers, of New York City, for Design for Statuary: The Town Pump.

1,599.—Lewis J. Cohen, of New York City, for Design for the backs of Playing Cards.

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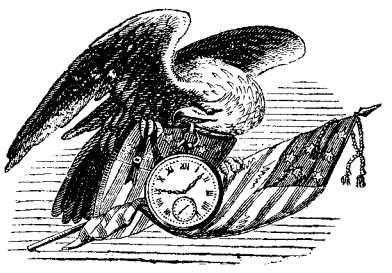

The new Patent Laws enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

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During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

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The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

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Every applicant for a Patent must furnish a model of his invention. If susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

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The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

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J. W. P., N. Y.—"The American Rifle" is the only work published in this country which contains accurate information respecting target rifles and shooting. There is a work published on military rifles by D. Van Nostrand, 192 Broadway, this city. You will find a drinking filter for soldier's use illustrated on page 368, Vol. IV. (new series) SCIENTIFIC AMERICAN.

G. B., of Phila.—You will find tables on the expansion of steam in every elementary work on the steam engine. Bournes' Catechism of the steam engine, containing such tables, may be found in your city.

H. H., of N. Y.—It is considered a good hydraulic ram that yields 50 per cent of the power, while a turbine has been made to yield 87 per cent. With 10 feet fall, therefore, your ram should raise 1-20th of the water 100 feet high, while the turbine should raise 1-12.

S. A. D., of Mass.—We know of nothing better for pasting your tape than roasted starch, such as is sold under the name of "British gum," or in little bottles as "mucilage."

J. P. C., of R. I.—Hard soap is formed by boiling tallow or oil in strong soda lyes for several days until saponification of the grease and the alkali is effected. Soft soap is made by using potash caustic lye.

W., of Ohio.—We do not know where you can purchase a chain tile machine, but feel quite certain that a dollars' worth of advertising in the SCIENTIFIC AMERICAN would discover to you a manufacturer.

J. M. W., of Va.—We judge from the description given in your letter that you are trying to invent a perpetual motion. If we are right in our conjecture you had better stop where you are. You cannot succeed, and the sooner you act upon our advice the less disappointment you will experience in the end.

R. M., of Pa.—There is no "instrument that will attract silver or gold in the earth naturally or buried by man." The belief in an instrument of this character, as well as in finding water by witch hazels, is simply a delusion of ignorance. The best place to seek for treasures in your country is in the golden grain of your wheat fields.

M. B., of Iowa and P. M. McN., of Mich.—We know of nothing better to coat your iron smokestacks with than whitewash made of clear water and lime.

E. S. W., of D. C.—You will find practical instructions for electro-plating in Smee's Electro Metallurgy, published by John Wiley, of this city.

W. R. De F.—J. W. Nystrom, of Philadelphia, has published a work which probably contains the information you need.

A. S., of Ind.—Your submarine-gun port differs from all others we have seen and we think a patent might be obtained for it. Its simplicity is, we think, a great recommendation.

L. S. J. M., of Mo.—If you have made an invention capable of running economically, a clock, churn lathe, grist mill, saw mill, &c., without steam fire or spring, and requiring no attention, it will be one of the greatest discoveries ever made by man since the days of Noah. There is no danger of its being taken from you so long as you keep it a secret, but if you intend to patent your invention you must make a working model of it.

J. F. R., of Mass.—You will find a screw rice-dressing machine illustrated on page 17, Vol. IV. (new series) SCIENTIFIC AMERICAN

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At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, June 4, 1862:—

N. P. O., of N. Y., $43; H. C. R., of Pa., $20; C. H. B., of Mass., $45; J. M. D., of Va., $20; H. B., of Wis., $20; H. & S., of N. Y., $45; C. & M., of Iowa, $20; G. P., of Mass., $20; G. McK., of Ill., $20; W. D. A., of N. Y., $20; J. B. R., of N. Y., $48; C. M. S., of Mass., $30; J. C. T., of Ind., $30; J. H. V., of Mass., $20; L. W. P., of Mass., $70; C. H. P., of N. Y., $20; E. M. B., of Ill., $15; J. M., of Conn., $20; W. H. G., of N. Y., $20; R. H., of N. Y., $45; C. E. H., of N. Y., $20; W. L. F., of N. J., $20; E. M., of Conn., $20; R. T. H., of Mass; $45; S. W., of Mass., $20; J. B., of Iowa, $20; A. H. & J. A. B., of Pa., $20; M. S. & S. of N. Y., $45; F. & W., of N. Y.; $330; H. & F., of Conn., $15; F. R., of N. Y., $22; J. G., of N. Y., $40, W. W. M., of Mo., $25; J. B. E. & Co., of Iowa, $20; E. Y. C., of Ind., $25; E. T. S., of N. Y., $150; M. G., of Pa.; $25; V. W. B., of Vt., $12; L. & A., of N. Y., $20; J. F. T., of Mass., $15; P. C. T., of N. Y., $12; J. W. P of N. Y., $15; J. K. H., of Ind., $15; W. & T., of N. Y., $15; C. F. W., of Pa., $25; C. & L., of Mass., $15; T. O. C., of Wis., $25; L. L. of N. Y., $15; G. B. H., of N. Y., $15; F. H. G., of N. Y., $15; N. F., of N. Y., $25; N. & C., of Pa., $25; A. B., of Ill., $15; H. P. B., of N. Y., $15; H. B. & Bros., of N. J., $20; H. N. H., of Vt., $15; G. B. R., of Ill., $25; S. W. R., of Mass., $10; R. K., of N. Y., $12; N. H. S., of N. H., $15; H. I. S., of N. Y., $22; C. C., of Iowa, $25; C. L. G. of Conn., $15; C. L. M., of N. Y., $10; N. K. Co., of Conn. 25; C. E. P., of Mass., $15; I. B. J., of O., $25; C. A. P., of Mich., $25; W. H. H. & L. H. McF., of N. Y., $25; J. B. W., of Mass., $15; G. & C., of Conn., $15; W. G. R., of Pa., $12; L. & A., of N. Y., $10; G. S., of N. Y., $28; H. K., of N. Y., $25; J. H. T., of N. J., $25; C. B. R., of N. J., $28; B. Z.; of N. Y., $20.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from May 29 to Wednesday, June 4, 1862:—

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Consultation may be had with the firm between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Offices are cordially invited to call at their office.

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A pamphlet of information concerning the proper course to be pursued in obtaining Patents through their Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the Principal Office, or either of the Branches. They also furnish a Circular of information about Foreign Patents.

The annexed letters from former Commissioners of Patents we commend to the perusal of all persons interested in obtaining Patents:—

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Immediately after the appointment of Mr. Holt to the office of Postmaster General of the United States, he addressed to us the subjoined very grateful testimonial:—

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Your obedient servant, J. HOLT.

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A MESSIEURS LES INVENTEURS—AVIS IMPORtant. Les Inventeurs non familiers avec la langue Anglaise et qui préféreraient nous communiquer leurs inventions en Français, peuvent nous addresser dans leur langue natalie. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront reçues en confidence. MUNN & CO.,
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Improved Projectile.

The accompanying engraving represents the most intricate and perhaps the most destructive projectile that has yet been devised. It consists of one large shell into which several small shells are inserted at right angles to its axis, with charges of powder below them, so that they will be driven out, either after the projectile strikes or during its flight; the smaller shells as well as the large then exploding and scattering their destructive fragments in all directions.

Fig. 1 is a longitudinal section of the projectile. The exterior portion, A, is simply a cast-iron shell of the usual acorn shape, and this is pierced with 8 holes, B B B, in 2 series of 4 holes each, equidistant from each other around the periphery of the shell. Into the axis of the projectile is inserted a hollow tube, C, of cast iron, which has short tubes or mortars, D D D D, cast upon it in such position that their bores may correspond with the holes, B B. Each of these mortars is charged with powder and with a projectile, E, which may be either a solid shot, or a shell constructed like the main projectile, and containing bullets in the tubes in its sides.

The mortars, D D, are discharged by means of a fuse, which is wound spirally around a tube in the axis of the projectile. This tube is represented in larger scale in fig. 2. A percussion cap, *g*, fig. 1, is placed on the end of a small iron pin which enters the projectile at its apex, and is surrounded by a small charge of powder to act as priming. Into this charge of powder one end of the fuse, *h*, is brought through a hole in the wall of the tube, I, and when the projectile strikes, the cap, *g*, is exploded, burning the priming and setting fire to the end of the fuse. As the fuse burns, the fire comes in succession to the vents, *g g*, of the several mortars, D D, and discharges them, driving out the shells, E, which then explode. A flange, *k*, is formed upon one side of the tube, I, in order that it may be certain to be inserted in the proper position to bring the fuse in contact with the vents of all the mortars.

The interior of the tube, I, is filled with gunpowder, and the lower end of the fuse is carried through the wall of the tube so that it may ignite this powder after the mortars are all discharged. The burning of this powder explodes the main shell and completes its work of destruction.

The cavity in the interior of the shell is divided near the forward end by the metallic diaphragm, *l*, into two chambers, *m* and *n*. The forward chamber, *n*, is filled with scraps or chips of iron to ballast the shell, that is, to carry the center of gravity forward of the center of mass, and thus make sure that the apex of the projectile shall always be forward throughout its flight. The chamber, *m*, is filled with powder which burns at the same time with the powder in the tube, I, and thus adds to the force of the explosion, and the fragments of iron in the chamber, *n*, are scattered when the shell bursts.

The fuse, *h*, may be fired by a time fuse and thus discharge the mortars, D, during the flight of the projectile if this is deemed desirable.

Fig. 1

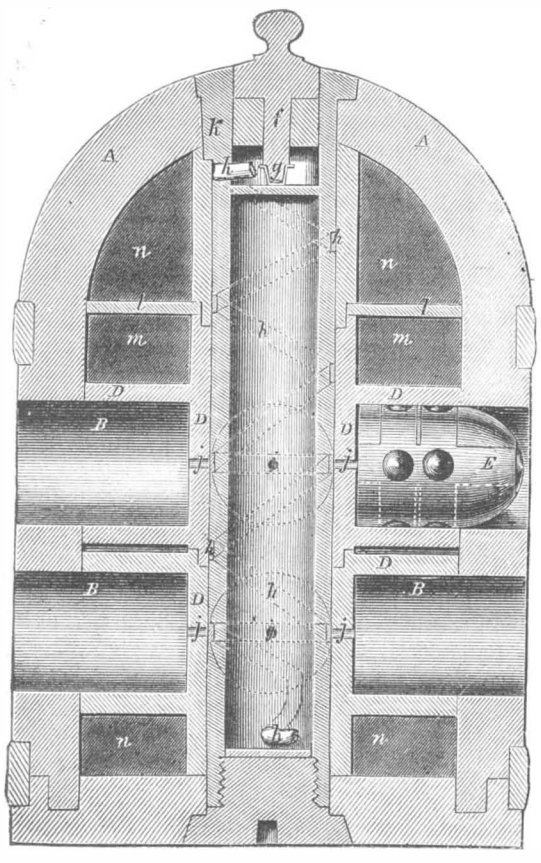
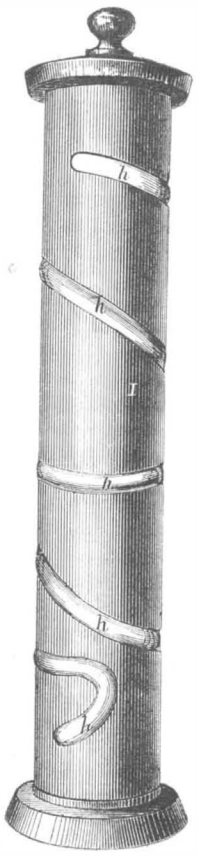


Fig. 2



RIPPON'S PROJECTILE.

Application for a patent for this invention has been made through the Scientific American Patent Agency, and further information in relation to it may be obtained by addressing the inventor, William F. Rippon, at Providence, R. I.

Tubular Bricks.

The society for improving the condition of the laboring classes in London, highly commend the use of tubular bricks for purposes of construction. According to an official statement made by the society, a size has been chosen which, with the omission of the headers, reduces, by about one-third, the number of joints, and greatly improves the appearance of the work, giving it more boldness of effect and resemblance to stone than that of ordinary brickwork. This size is twelve inches long, and three courses rise one foot in hight—a size equally convenient for the workmen in the manufacture, and in the use of the bricks. Nine bricks of this kind and size will do as much walling as sixteen of the common sort, while the weight of the former but little exceeds that of the latter. When passing through the machine, or in the process of drying, any number may be readily splayed at the ends for gables, or marked for closures and broken off as required in use, or they may be perforated for the purpose of ventilation.

Yankee Contrivances in the Churches of Boston.

If the organ-blower's occupation is not already gone, there appears a fair prospect that the period is not very remote when the organist may dispense with the services of his "assistant." In the new Methodist Episcopal Church, on Tremont street, Boston, the organ-blowing is performed by *water power*—a small stream of Cochituate being introduced, which does the work admirably, without getting the "sulks" and quareling with the organist. All that the latter has to do is to turn a stop-cock, which lets on the water, and the organ bellows are put in motion, and supply all the wind desired. In the new church spire of Rev. Dr. Gannett, also in the City of Notions, there is a fine chime of bells, which is to be played upon by means of *electricity*, so that the performer may cause them all to sound exactly in the respective order he may desire, while seated at a keyboard similar to that of an organ.

WHALES AGROUND.—A shoal of whales ran ashore lately at Whiteness, on the Isle of Shetland, and getting into shallow water, immense numbers—four hundred, it is said—were captured by the islanders. They were attacked both by sea and land. Some escaped, but were wounded, sank, and afterward rose to the surface, and floated to shore, so that almost the entire shoal was captured. People came from miles around, and a number of riflemen hurried to the spot to enjoy the novel sport of whale shooting.

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